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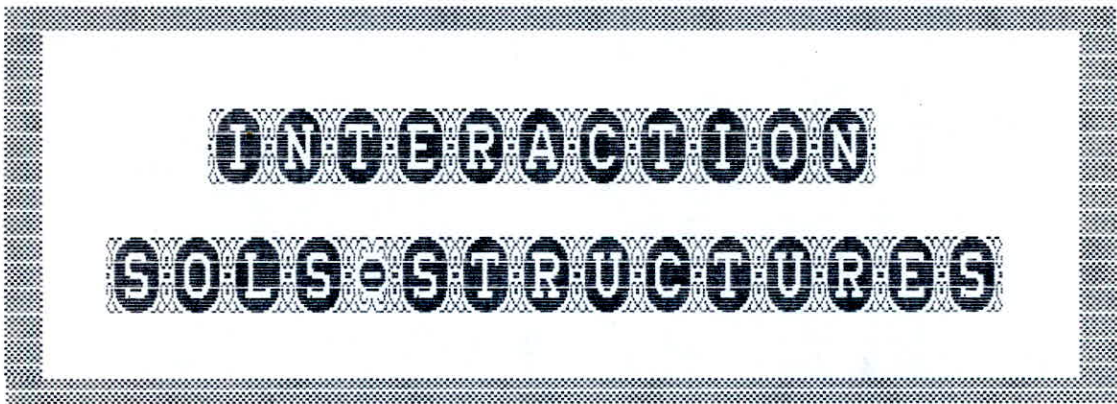
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Génie - Civil

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Projet de Fin d'Etudes



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Promotion : JUIN 1991.

D E D I C A C E S .

Je dédie ce projet

à mes PARENTS

et à la PAIX, la LIBERTE et la PROSPERITE dans mon
pays l'ALGERIE.

M.A. BERRAHMA.

Je dédie ce travail:

- . à mes PARENTS
- . à mes FRERES et SOEURS
- . à tous mes ami(es) d'Oran et Alger.

K. ALLAOUA.



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M.A. BERRAHMA

K. ALLAOUA.

OBJET DU SUJET

Ce projet consiste en l'étude dynamique d'une Structure dans le cas où elle est encastrée à sa base, et dans le cas où elle repose sur une fondation.

On procédera par la suite à la comparaison des résultats obtenus dans les deux cas, en se référant aux graphes.

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This study is presented for the purpose to compare the results obtained for a Structure taken in two different cases:

- . in the first instance, the Structure is rattaché to a rigid fondation (or embedded into soil)
- . and the second, the Structure is supported by a flexible fondation (including soil-structure interaction effect)

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INTRODUCTION

Jusqu'à ces dernières décennies (60-70) , les méthodes d'analyse utilisées par les ingénieurs pour la détermination de la réponse d'une structure à une excitation sismique supposaient cette structure rattachée à une fondation rigide , par conséquent l'influence de la fondation et son milieu n'était pas prise en compte dans les calculs de la structure .

Cette procédure qui tendait à simplifier l'analyse mathématique du problème , en supposant qu'il n'y avait pas d'interaction entre la structure et sa fondation , était contraire aux diverses observations faites dans ce domaine ; MARTEL , DUKE , et MURPHY ont présenté des études sur le comportement d'une structure vis-à-vis un séisme incluant les effets de la fondation et son milieu , et ont conclu qu'il y avait une certaine relation séisme - sol - structure .

La relation dynamique entre la réponse de la structure et les caractéristiques de sa fondation et son milieu est communément appelée " effet d'interaction " . Ce phénomène d'interaction est principalement dû à un mécanisme d'échange d'énergie entre le sol et la structure

Dans ce projet , on étudiera une structure (en voiles ensuite en portique) , dans le cas où elle est encastree à sa base , et dans le cas où elle repose sur une fondation ; on se limitera dans l'étude de l'interaction sol-structure au domaine temps .

GENIE PARASISMIQUE

1- INTRODUCTION

L'importance des tremblements de terre est devenue plus insistante après l'avenement de plusieurs catastrophes au fil des années, ce qui a mis à nu plusieurs modèles de constructions où la sécurité s'avérait insuffisante relativement à ce que peut proposer le génie parasismique de possibilités.

2- EVOLUTION DES CALCULS SISMIQUES

La lutte contre les dommages éventuels des tremblements de terre date du commencement de la civilisation humaine. Des constructions anciennes situées dans des régions sismiques montrent que leurs constructeurs prévoient certaines mesures de protection antisismiques.

D'après des manuscrits historiques, les premiers essais d'observation instrumentale des effets sismiques remontent au II^e siècle, et tous progrès réalisés ultérieurement ont été liés aux investigations des dommages sismiques, base expérimentale indispensable à toute amélioration.

A la suite de graves tremblements de terre survenus au XIX^e siècle des échelles d'estimation primaires de la force sismique ont été créées, et certaines règles de constructions dans les régions sismiques ont été élaborées.

3- METHODES DE CALCULS

3-1 THEORIE "STATIQUE"

Cette théorie a été mise au point par T.OMORI après la catastrophe de MONO.OVARI au JAPON en 1891. Il considérait que la structure comme absolument rigide et négligeait sa déformabilité propre.

La théorie consistait en la détermination de la force sismique pour une structure plus au moins fictive et qui aurait le même mouvement que le sol; en ce cas les valeurs maximales des forces sismiques peuvent être représentées par une fraction du poids propre de la construction :

$$S = m \gamma = Q \frac{\gamma_0}{g}$$

m = masse d'une partie de la construction.

Q = poids de la même partie.

S = force sismique agissant sur cette partie .
 γ_0 = accélération maximale à la base de la construction .
 g = accélération de la pesanteur .

La force S étant une force statique , le champs d'application de cette méthode ne peut être généralisé et concerne uniquement des constructions à faible déformabilité .

3-2 PREMIERS MODELES DYNAMIQUES *****

L'aspect dynamique qui a été négligé dans la théorie statique a été pris en compte dès 1920 par MONONOBE , en introduisant un coefficient dynamique dans la formule d'évaluation de la force sismique :

$$S = Q * \beta * \frac{\gamma_0}{g}$$

β = coefficient dynamique .

$$\beta = \frac{1}{1 - (T / T_0)}$$

T = période propre de la construction .

T_0 = période des vibrations de la base .

Le seisme étant considéré comme étant un processus rythmique assez régulier , sa période T_0 est de l'ordre de 1 seconde .

La valeur de β était admise pour des constructions rigides et tel que le rapport T/T_0 est compris entre 0 et 0,6 , mais pour les constructions flexibles ceci n'était pas applicable , ce n'est qu'en 1927 que K.S.ZAVARIEV a introduit une nouvelle valeur de β le rendant ainsi :

$$\beta = \frac{2}{1 - (T / T_0)^2}$$

3-3 METHODE SPECTRALE *****

Cette méthode a été introduite d'après les données expérimentales fournis par des sismographes et accélérographes construits au JAPON entre 1920 et 1935 , ces derniers ont montré que les seismes ne pouvaient être traités mathématiquement d'une manière simple et que le spectre de leurs fréquences avait une allure complexe .

Initiée par M.A BIOT en 1933 , et développée par la suite G.W.HOUSNER, J.L ALFORD, J.L KORTCHNISKY , R.H MARTEL , la méthode spectrale tient compte des valeurs maximales des caractéristiques cinématiques des constructions (élongations, vitesses, accélérations) , en d'autres termes , elle consiste en l'étude

dynamique d'oscillateurs ayant même caractéristiques dynamiques (période ,amortissement) que les structures réelles , et sollicité par un processus vibratoire conforme à un sismographe réel ou présumé .

On en déduit les courbes spectrales ou spectres de réponse qui donnent les valeurs maximales des accélérations , vitesses , ou déplacements de l'oscillateur en fonction de sa période propre et de son amortissement .

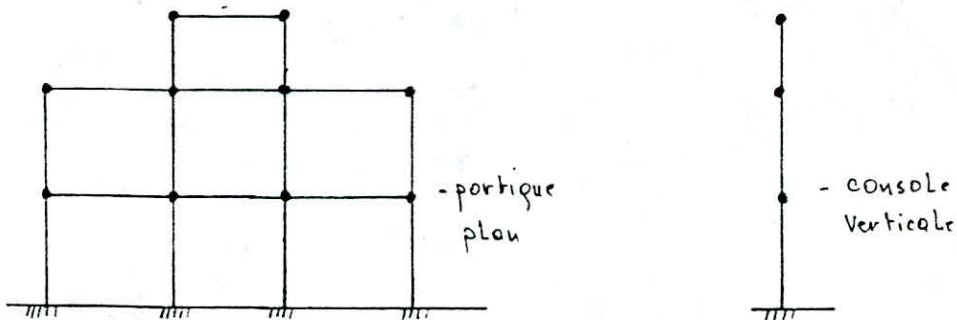
Ces courbes spectrales seront directement utilisées pour le calcul des constructions .

4- ETUDE D'UNE STRUCTURE ENCASTRE A SA BASE

4-1 INTRODUCTION

Une structure à plusieurs degrés de liberté encastrée à sa base est composée de plusieurs masses reliées entre elles et à une base fixe par des ressorts et amortisseurs .

Les structures ayant un comportement élastique et linéaire peuvent être modélisées à l'aide de barres ou éléments finis et comportant une masse associée à chacun des noeuds , les masses dans ce cas sont supposées concentrées par les noeuds .



4-2 CONSTRUCTION DES MATRICES

Pour un oscillateur simple présentant un mécanisme d'amortissement et soumis à une excitation , l'équation de mouvement dérive de la relation :

$$F = m \ddot{x}$$

F se décompose en :

- Force de rappel (ou de rigidité) : $F_1 = - K x$
- Force d'amortissement : $F_2 = - c \dot{x}$
- Force excitatrice : $F_3 = P(t)$

Dans le cas d'un oscillateur multiple , l'équation de mouvement s'écrit sous une forme matricielle , mettant en évidence les matrices de masse , de rigidité , et d'amortissement , et les déplacements , les vitesses , les accélérations ainsi que la force perturbatrice seront écrit sous forme vectorielle .

4-2-1 Matrice de rigidité [K]

En réalité une structure possède une infinité de degrés de liberté donnée par les composantes des déplacements de chacune des "particules" formant cette structure . Mais des modèles existent permettant de limiter le nombre de degrés de liberté au déplacements des noeuds pour les éléments barres et en fonction des déplacements nodaux pour les éléments bidimensionnels et tridimensionnels .

Les forces nodales sont reliées aux déplacements nodaux par une matrice définie comme matrice de rigidité de la structure et désignée par K .

Dans la majorite des cas partiques , les déplacements nodaux requis notamment pour le calcul des modes et fréquences propres : limités aux déplacements latéraux des différents niveaux dans ce cas on doit dégager une matrice de rigidité réduite K' relative aux degrés de liberté dynamique pris en compte .

A partir de la matrice de rigidité de la structure K relative aux composantes de tous les déplacements (linéaire et angulaire) de tous les noeuds de la structure peut être écrite en partition comme

$$K_s = \begin{bmatrix} A & | & B \\ \hline C & | & D \end{bmatrix}$$

où la sous matrice D correspond au degrés de liberté dynamique , la condition d'équilibre des noeuds permet d'écrire :

$$\begin{bmatrix} P_1 \\ P_2 \\ P_3 \end{bmatrix} = K_s \begin{bmatrix} D_1 \\ D_2 \\ D_3 \end{bmatrix}$$

qui peut s'écrire en considérant la matrice K_c dans sa totalité

$$\begin{bmatrix} 0 \\ \hline P_1 \\ P_2 \\ P_3 \end{bmatrix} = \begin{bmatrix} A & | & B \\ \hline C & | & D \end{bmatrix} \begin{bmatrix} \Delta \\ \hline D_1 \\ D_2 \\ D_3 \end{bmatrix}$$

où Δ représente tous les déplacements sauf D1, D2, D3

$$\begin{cases} 0 = A \cdot \Delta + B \begin{bmatrix} D1 \\ D2 \\ D3 \end{bmatrix} \\ \begin{bmatrix} P1 \\ P2 \\ P3 \end{bmatrix} = C \cdot \Delta + D \begin{bmatrix} D1 \\ D2 \\ D3 \end{bmatrix} \end{cases}$$

D'où :

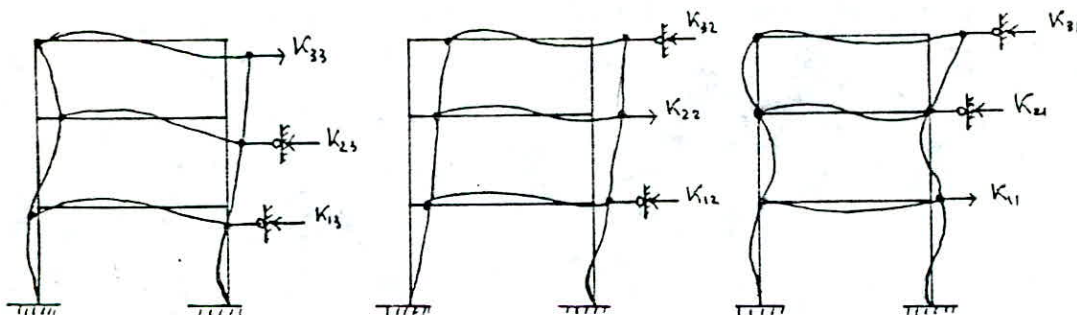
$$\Delta = -A^{-1} \cdot B \cdot \begin{bmatrix} D1 \\ D2 \\ D3 \end{bmatrix}$$

$$\begin{bmatrix} P1 \\ P2 \\ P3 \end{bmatrix} = (-C \cdot A^{-1} \cdot B + D) \begin{bmatrix} D1 \\ D2 \\ D3 \end{bmatrix}$$

D'où on déduit que :

$$K'_S = D - C \cdot A^{-1} \cdot B$$

Pour un portique la matrice de rigidité s'écrit en considérant les schémas suivants :



$$K'_S = \begin{bmatrix} k_{11} & k_{12} & k_{13} \\ k_{21} & k_{22} & k_{23} \\ k_{31} & k_{32} & k_{33} \end{bmatrix}$$

4-2-2 Matrice d'amortissement [C]

Les structures peuvent présenter un amortissement substantiel quand elles sont assujetties à des chargements dynamiques cependant l'évaluation de ce genre de phénomène reste à ce jour tout à fait vague et empirique et ne peut en aucune cas être qualifié avec certitude .

Généralement , on présente la matrice d'amortissement par :

$$C = a_0 M + a_1 K$$

M et K étant respectivement la matrice masse et la matrice rigidité .

Les constantes a_0 et a_1 peuvent être reliées aux facteurs d'amortissement de n'importe quel mode j par :

$$\xi_j = a_0 / 2 \omega_j + a_1 \omega_j / 2 \quad (B)$$

ξ_j = facteur d'amortissement du mode j .
 ω_j = fréquence circulaire propre au mode j .

elle peut être déterminée par l'analyse d'oscillateur libre

d'après l'équation (B) , on aura donc alors si on ne tient compte que des 2 premiers modes :

$$a_0 = 2 \omega_1 \cdot \omega_2 (\xi_2 \omega_1 - \xi_1 \omega_2) / (\omega_1^2 - \omega_2^2)$$

$$a_1 = 2 (\xi_1 \omega_1 - \xi_2 \omega_2) / (\omega_1^2 - \omega_2^2)$$

Ces facteurs d'amortissement sont généralement déterminés expérimentalement à l'aide des machines vibrantes sur des constructions existantes , pour illustrer cette remarque , le tableau suivant donne les facteurs d'amortissement de quelques structures en % :

| | |
|-------------------------------|----------|
| Portiques en B A | 2 à 15 % |
| Murs porteurs et préfabriqués | 5 à 20 % |
| Structures métalliques | 2 à 6 % |
| Ponts en B A | 3 à 15 % |
| Ponts métalliques | 2 à 10 % |
| Constructions massives | 5 à 10 % |
| Sols de fondation | 5 à 40 |

4-2-3 Matrice des masses ou d'inertie [M]

L'approche par concentration des masses qui suppose que la masse au lieu d'être répartie le long d'un élément est concentrée en un nombre de points adéquatement choisis (noeuds) permet une représentation simplifiée de la matrice d'inertie .

Ce mode de représentation substitue donc à la distribution continue de la masse de la structure réelle une série de masses nodales concentrées .

Il est à noter que les résultats d'analyse d'une structure par les deux représentations : concentrations des masses et déplacements généralisés ont montré clairement que les erreurs commises sont faibles.

L'avantage de l'approche par concentration des masses est qu'elle simplifie les calculs numériques puisqu'en excluant les couplages entre les différents déplacements, elle diagonalise la matrice d'inertie qui prend la forme suivante :

$$[M] = \begin{bmatrix} m_1 & & & \\ & m_2 & & \\ & & \ddots & \\ & & & m_n \end{bmatrix} \text{ sym}$$

m_i étant la masse concentrée relative au point d'application et à la direction du déplacement x .

4-3 EQUATION DE MOUVEMENT -CALCULS-

Après développement des différentes matrices, l'équation du mouvement s'écrit :

$$[M] \ddot{\{X\}} + [C] \dot{\{X\}} + [K] \{X\} = P(t) \quad (1)$$

La relation (1) à un nombre équations égal au nombre de degrés de liberté de la structure.

Si la force excitatrice $P(t)$ est une action sismique donnée par son accélération \ddot{X}_g alors l'équation (1) se transforme en un système d'équation dont l'écriture matricielle est la suivante :

$$[M] \ddot{\{X\}} + [C] \dot{\{X\}} + [K] \{X\} = -[M] \ddot{\{X_g\}} \quad (2)$$

4-3-1 Fréquence propres et modes propres

Une structure classique idéale est dépourvue de tout amortissement de sorte qu'elle peut vibrer indéfiniment tant qu'il soit nécessaire de lui fournir de l'énergie, ce comportement est purement théorique en raison de l'existence inévitable de phénomène de frottement qui amortissent le mouvement, toute fois ceux ci sont très faibles, de sorte que les vibrations libres peuvent subsister assez longtemps.

A- La méthode de la matrice de rigidité K

En vibration libre non amortie, l'équation du mouvement d'un système à n degrés de liberté s'écrit :

$$[M] \ddot{\{X(t)\}} + [K] \{X(t)\} = 0 \quad (3)$$

En admettant le mouvement oscillatoire harmonique, les solutions particulières peuvent s'écrire sous la forme suivante :

$$\begin{cases} x_1(t) = A_1 \sin(\omega t + \varphi) \\ x_2(t) = A_2 \sin(\omega t + \varphi) \\ \vdots \\ x_n(t) = A_n \sin(\omega t + \varphi) \end{cases} \quad (4)$$

A_i étant l'amplitude, ω la fréquence de vibration, et φ le déphasage.

Les solutions (4) remplacées dans le système conduisent à

$$\begin{cases} (K_{11} - m_1 \omega^2) A_1 + K_{12} A_2 + \dots + K_{1n} A_n = 0 \\ K_{21} A_1 + (K_{22} - m_2 \omega^2) A_2 + \dots + K_{2n} A_n = 0 \\ \vdots \\ K_{n1} A_1 + K_{n2} A_2 + \dots + (K_{nn} - m_n \omega^2) A_n = 0 \end{cases}$$

soit sous forme matricielle :

$$(K'_3 - \omega^2 M) \{A\} = 0 \quad (5)$$

Comme $\{A\}$ n'est généralement pas nul, la solution est donnée par :

$$D(\omega) = |K'_3 - \omega^2 M| = 0$$

La résolution de cette équation constitue un problème typique aux valeurs propres et permet d'obtenir n pulsations propres, soit :

$$\omega_1 < \omega_2 < \dots < \omega_n.$$

A chaque valeur propre correspond une forme d'oscillation, l'ensemble des valeurs propres et des formes propres est appelé :

" MODE PROPRE OU NORMAL DE VIBRATION "

En remplaçant la pulsation propre dans le système (5), il s'en suit :

$$\begin{cases} (K_{11} - M_1 \omega_1^2) A_1 + K_{12} A_2 + \dots + K_{1n} A_n = 0 \\ K_{21} A_1 + (K_{22} - M_2 \omega_1^2) A_2 + \dots + K_{2n} A_n = 0 \\ \vdots \\ K_{n1} A_1 + K_{n2} A_2 + \dots + (K_{nn} - M_n \omega_1^2) A_n = 0 \end{cases}$$

Le mode propre $\{A_j\}$ ne peut être déterminé que sous forme de rapport de déplacement nodaux.

On doit se donner une des composantes $A_j^{(i)}$ pour trouver les autres déplacements. Les modes propres sont habituellement normalisés par rapport à la plus grande composante, si $A_1^{(i)}$ est cette dernière, on pose :

$$\phi_{k,i} = \frac{A_k^{(i)}}{A_1^{(i)}}$$

où $\phi_{k,i}$ représente l'ordonnée du mode propre i . Si l'on choisit $A_1^{(i)} = 1.000$, on obtient alors un système en $\phi_{k,i}$ de $(n-1)$ équations dont la résolution donne la forme de la vibration propre correspondant à ω_i (On note que l'amplitude reste inconnue).

On trouve ainsi 2 matrices : la matrice spectrale donnée par :

$$[\omega^2] = \begin{bmatrix} \omega_1^2 & & 0 \\ & \ddots & \\ & & \omega_i^2 & \\ & & & \ddots \\ 0 & & & & \omega_n^2 \end{bmatrix}$$

et la matrice modale donnée par :

$$\Phi = [\{\phi_1\}, \{\phi_2\}, \dots, \{\phi_n\}]$$

$$[\phi] = \begin{bmatrix} \phi_{11} & \phi_{12} & \dots & \phi_{1n} \\ \phi_{21} & \phi_{22} & \dots & \phi_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ \phi_{n1} & \phi_{n2} & \dots & \phi_{nn} \end{bmatrix}$$

Les amplitudes des modes de vibration obtenus par la résolution du problème aux valeurs propres étaient arbitraires, il y a des modes de normalisation qui consiste à ajuster chaque amplitude $\hat{\phi}_n$ qui satisfait à la condition :

$$\hat{\phi}_n^T M \hat{\phi}_n = 1$$

$$\hat{A}_n^T M \hat{A}_n = \hat{M}_n \quad \text{où } \hat{A}_n \text{ représente une amplitude modale arbitraire}$$

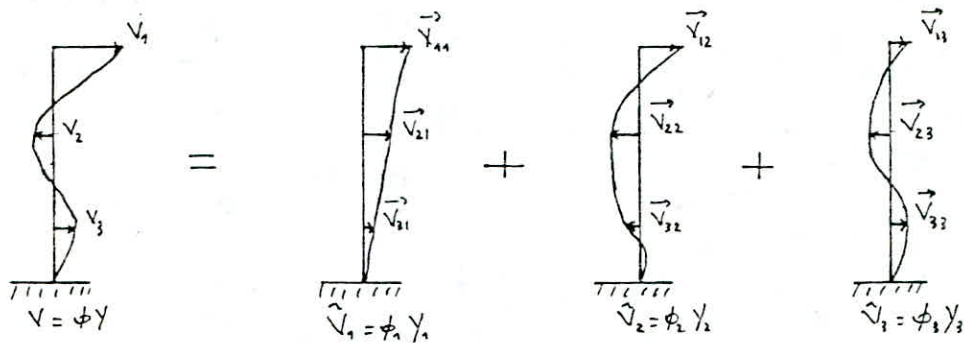
$$\text{D'où on a : } \hat{\phi}_n = \hat{A}_n \hat{M}_n^{-1/2}$$

B) Coordonnées principales normales

Dans l'étude des systèmes quelconques à N degrés de liberté qui précède la déformation à un instant donné était définie par N composante du vecteur V .

Dans le cas de système linéaire, une représentation beaucoup plus utile est rendue possible par les modes de vibration libre. Ces modes correspondent à N allures de déplacements indépendants, dont les amplitudes peuvent servir de coordonnées généralisées pour représenter un déplacement quelconque. Les modes de vibration jouent le même rôle que les termes d'un développement en série de Fourier et ils présentent les mêmes avantages, orthogonalité et possibilité d'une représentation satisfaisante des déplacements à l'aide d'une approximation limitée à quelques termes seulement.

Prenant le cas de la poutre encastree dont la déformée est définie par la mesure de 3 flèches le long de son axe original; on peut représenter sur cette structure un vecteur déplacement V quelconque en superposant les amplitudes, convenablement déterminées des 3 modes de vibration (fig.).



Pour chaque composante modale \hat{A}_n , les déplacements sont donnés par le vecteur modal $\hat{\phi}_n$ multiplié par l'amplitude modale Y_n

$$\hat{V}_n = \hat{\phi}_n Y_n$$

Les déplacements sont la somme des composantes modales :

$$A = \phi_1 Y_1 + \phi_2 Y_2 + \dots + \phi_n Y_n = \sum_{n=1}^N \phi_n Y_n$$

Soit en notation matricielle : $V = \phi Y$ (6)

On remarque que la matrice ϕ de l'équation (6) permet de passer du vecteur Y des coordonnées généralisées au vecteur V des coordonnées géométriques. Les amplitudes modales, ou coordonnées généralisées sont appelées coordonnées principales (ou normales) de la structure.

Pour calculer une coordonnée principale quelconque Y_n , l'équation (6) peut être multipliée par le produit de la transposée du vecteur modal correspondant par la matrice de masse

$$\phi_n^T M V = \phi_n^T M \phi Y$$

Si on développe le second membre de cette équation, on obtient :

$$\phi_n^T M \phi Y = \phi_n^T M \phi_1 Y_1 + \dots + \phi_n^T M \phi_n Y_n \quad (7)$$

Tous les termes de cette somme s'annulent sauf celui qui correspond à ϕ_n et ce en raison de la propriété d'orthogonalité des modes de vibration par rapport à la matrice de masse. En conservant ce terme non nul dans le second membre de l'équation (7) on obtiendra :

$$\begin{aligned} \phi_n^T M V &= \phi_n^T M \phi_n Y_n \\ Y_n &= \phi_n^T M V / \phi_n^T M \phi_n \end{aligned}$$

A chaque coordonnée principale, il correspond une expression de ce type.

Soit $[\phi]^T$ l'ensemble des vecteurs propres normalisés
On aura donc :

$$\begin{aligned} [\phi]^T [M] [\phi] &= [I] && = \text{matrice diagonale} \\ [\phi]^T [K] [\phi] &= [\Omega] = [\omega_i^2] && = \text{matrice diagonale} \\ [\phi]^T [C] [\phi] &= [2\omega_i \xi_i] = [\beta] && = \text{matrice diagonale} \end{aligned}$$

ω_i = fréquence propre du mode i
 ξ_i = facteur d'amortissement du mode i

Pour cette étape on aura donc des équations découplées du mouvement. L'équation du mouvement de chaque mode peut alors s'écrire de la manière suivante, en combinant la masse et les chargements généralisés du mode avec la fréquence angulaire propre (ou modale) ω_n et la valeur donnée du facteur d'amortissement modal :

on aura finalement :

$$\ddot{Y}_n + 2 \xi_n \omega_n \dot{Y}_n + \omega_n^2 Y_n = \frac{P_n(t)}{M_n}$$

L'étape précédente conduit à un système de N équations de mouvement indépendantes, correspondant chacune d'elles à un mode de vibration. Ces équations représentent autant de systèmes à 1 degré de liberté et se résolvent par toute méthode convenant au type de chargement.

L'expression générale de la réponse est donnée par l'intégrale de DUHAMEL :

$$Y_n(t) = \frac{1}{M_n \omega_{dn}} \int_0^t P_n(\tau) e^{-\xi_n \omega_n (t-\tau)} \sin \omega_{dn} (t-\tau) d\tau$$

4-3-2 Methodes approchées pour l'évaluation des fréquences et modes propres

A) Methode de RAYLEIGH

L'énergie potentielle maximale d'un système effectuant des oscillations harmoniques est donnée par

$$E_{pmax} = (1/2) \overset{T}{X_{max}} K X_{max}$$

L'énergie cinétique maximale est atteinte quand les déformations sont nulles et que la vitesse est maximale, elle est donnée par :

$$E_{cmax} = (1/2) \overset{T}{X_{max}} M \overset{\cdot}{X}_{max}$$

Le principe de conservation de l'énergie entraîne :

$$\omega^2 = \frac{\overset{T}{X_{max}} K X_{max}}{\overset{T}{X_{max}} M \overset{\cdot}{X}_{max}} \quad (\text{rapport de RAYLEIGH})$$

ω^2 pourrait aussi être calculé en résolvant l'équation suivante :

$$X \{ K - \omega^2 M \} = 0$$

Cette méthode n'est utilisée que si les amplitudes X_i sont connues c'est à dire l'allure de la déformé est connue. Cette méthode consiste à choisir les amplitudes X_{max} et répéter la procédure jusqu'à convergence.

La configuration correspondant au mode fondamental est en général celle que provoqueraient les charges statiques $P_i = m_i \cdot g$.

B) Methode de JACOBI

La méthode de JACOBI a l'avantage de pouvoir aider à déterminer un grand nombre de modes propres.

Elle consiste à diagonaliser les matrices K et M et ceci en appliquant à ces matrices une série de transformations successives

$$\begin{array}{lll} \text{Si :} & K_1 = K & \text{et} & M_1 = M \\ & K_2 = T_1^T K_1 T_1 & \text{et} & M_2 = T_1^T M_1 T_1 \\ & K_{k+1} = T_k^T K_k T_k & \text{et} & M_{k+1} = T_k^T M_k T_k \end{array}$$

où T_k est une matrice orthogonale, c'est à dire :

$$T_k^T T_k = I$$

Les matrices K^d et M^d tendent vers les matrices diagonales K^0 et M^0 lorsque k tend vers l'infini .

Ceci permet d'ecrire :

$$K^d = \lambda M^d \quad \text{et} \quad \lambda = K^d M^{d-1}$$

D'où les valeurs propres :

$$\lambda_i = K_{ii}/M_{ii}$$

et :

$$\phi = T_1 T_2 T_3 \dots T_k \begin{bmatrix} \cdot & & & 0 \\ & \cdot & & \\ & & \cdot & \\ & & & 1/(M_{jj})^{1/2} \\ 0 & & & \cdot \\ & & & & \cdot \end{bmatrix}$$

La matrice orthogonale choisie dans cette méthode est la suivante :

$$T_k = \begin{bmatrix} 1 & & & & \\ & \ddots & & & \\ & & 1 & & \\ & & & \ddots & \\ & \beta & & & 1 \\ & & & & & \ddots \\ & & & & & & \alpha \end{bmatrix}$$

où α et β sont choisis tels qu'ils réduisent les éléments en (i,j) des matrices K et M à 0 simultanément

Si on pose les conditions suivantes

$$K_{ij}^{k+1} = 0 \quad \text{et} \quad M_{ij}^{k+1} = 0$$

On peut écrire :

$$\begin{aligned} \alpha K_{ii}^k + (1 + \alpha \beta) K_{ij}^k + \beta K_{jj}^k &= 0 \\ M_{ii}^k + (1 + \alpha \beta) M_{ij}^k + \beta M_{jj}^k &= 0 \end{aligned}$$

Si le cas suivant se présente :

$$K_{ii}/M_{ii} = K_{jj}/M_{jj} = K_{ij}/M_{ij}$$

Alors :

$$\alpha = 0 \quad \text{et} \quad \beta = -K_{ij}^k / K_{jj}^k$$

D'une manière générale :

$$a_1 = K_{ii} M_{ij} - M_{ii} K_{ij}$$

$$a_2 = K_{jj} M_{ij} - M_{jj} K_{ij}$$

$$a_3 = K_{ii} M_{jj} - K_{jj} M_{ii}$$

$$a_4 = a_3/2 + \text{signe}(a_3) ((a_3/2)**2 + a_1 * a_2)**0.5$$

Alors : $\beta = -a_1/a_4$ et $\alpha = a_2/a_4$

C) Méthode de RAYLEIGH-RITZ

Son intérêt est le passage d'un problème de valeurs propres de grande dimension n à un problème de dimension plus réduite q, dans ce cas on pourra calculer toutes les valeurs et vecteurs propres du système réduit par la méthode de JACOBI.

Le principe consiste à contraindre chaque vecteur propre du système $(K - \lambda M) \phi = 0$ à s'exprimer sous la forme d'une combinaison linéaire de q vecteurs de RITZ $(i=1..q)$ linéairement indépendants :

$$\phi = x_1 \psi_1 + x_2 \psi_2 + \dots + x_q \psi_q$$

$$\phi = [\{ \psi_1 \}, \{ \psi_2 \}, \dots, \{ \psi_q \}] \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_q \end{bmatrix}$$

$$\phi = \psi X = \sum_{i=1}^q x_i \psi_i$$

x_i = coefficients de RITZ (à déterminer)

ψ_i = vecteurs de RITZ (fixés)

ϕ = vecteur propre lié au système réduit de dimension q

Le but de la méthode est la recherche du minimum du quotient de RAYLEIGH qui s'exprime comme suit :

$$R(\phi_i) = \phi_i^T K \phi_i / \phi_i^T M \phi_i$$

$$\lambda_i = \min R(\phi_i)$$

Ce quotient doit être à la fin du processus itérative stationnaire

$$R(\phi_i) = \phi_i^T K \phi_i / \phi_i^T M \phi_i$$

$$= \frac{\{X\}^T [\psi]^T [K] [\psi] \{X\}}{\{X\}^T [\psi]^T [M] [\psi] \{X\}} = \frac{\{X\}^T [\tilde{K}] \{X\}}{\{X\}^T [\tilde{M}] \{X\}}$$

avec

$$\tilde{K} = \psi^T K \psi \quad \text{et} \quad \tilde{M} = \psi^T M \psi$$

$$R(\phi) = \frac{\sum_{j=1}^q \sum_{i=1}^q x_i x_j \tilde{K}_{ij}}{\sum_{j=1}^q \sum_{i=1}^q x_i x_j \tilde{M}_{ij}} = \frac{\tilde{K}}{\tilde{M}}$$

tel que $\tilde{K}_{ij} = \psi_i^T K \psi_j$ et $\tilde{M}_{ij} = \psi_i^T M \psi_j$

x_i etant les seules variables, le principe du quotient de RAYLEIGH minimum s'exprime par :

$$\frac{\partial R(\phi)}{\partial x_i} = 0 \quad i = 1, \dots, q$$

$$\frac{\partial R(\phi)}{\partial x_i} = \frac{2 \tilde{m} \sum_{j=1}^q x_j \tilde{K}_{ij} - 2 \tilde{k} \sum_{j=1}^q x_j \tilde{M}_{ij}}{\tilde{m}^2 \cdot q \cdot \theta} = 0$$

Sachant que : $R(\phi) = \tilde{K}/\tilde{M} \quad (\tilde{m} \neq 0)$

on aura : $\sum_{j=1}^q x_j (\tilde{K}_{ij} - R(\phi) \tilde{M}_{ij}) = 0 \quad i = 1, \dots, q$

soit $R(\phi_i) = R_i$, l'equation precedente sous forme condensée :

$$\tilde{K} X_i = R_i \tilde{M} X_i$$

| | | |
|----------------------------|-----------|----------------|
| \tilde{K} et \tilde{M} | dimension | $(q \times q)$ |
| X_i | dimension | $(q \times 1)$ |

D'ou la condition de stationnarité s'ecrit d'une manière générale :

$$\tilde{K} X = R \tilde{M} X$$

avec

$$X = \{ \{X_1\}, \{X_2\}, \dots, \{X_q\} \}$$

$$R = \begin{bmatrix} \vdots & & 0 \\ & \ddots & \\ 0 & & R_1 \end{bmatrix} \quad i = 1, \dots, q$$

Cette condition fournit q valeurs propres : R_1, R_2, \dots, R_q , comme approximation de $\lambda_1, \lambda_2, \dots, \lambda_q$, et q vecteurs propres :

$$\begin{cases} X_1^T = \{X_1^1, X_2^1, \dots, X_q^1\} \\ \vdots \\ X_q^T = \{X_1^q, X_2^q, \dots, X_q^q\} \end{cases}$$

Les vecteurs propres X_i sont utilisés pour déterminer les vecteurs $\phi_1, \phi_2, \dots, \phi_q$ qui sont des approximations des vecteurs propres $\phi_1, \phi_2, \dots, \phi_q$.

ainsi : $\phi_i = \sum_{j=1}^q x_j \psi_j \quad i = 1, \dots, q$

Les valeurs propres exactes et approchées verifient la relation :

$$\lambda_1 \leq R_1, \dots, \lambda_q \leq R_q \leq \lambda_n$$

pour obtenir rapidement les plus petites valeurs propres, on prend comme vecteur de RITZ, les solutions du système statique :

$$K \psi = F$$

$$\psi = [\{\psi_1\}, \{\psi_2\}, \dots, \{\psi_q\}]$$

$$F = [\{F_1\}, \{F_2\}, \dots, \{F_q\}]$$

F est la matrice des vecteurs sollicitations F_i qui sont des vecteurs unités, sollicitant les degrés de liberté i correspondant au plus petit rapport K_{ii}/M_{ii} :

$$F_i = \begin{bmatrix} 0 \\ 0 \\ i \\ 0 \end{bmatrix} \text{-----} \rightarrow \text{ligne } i$$

Le système $K \psi = F$ donne la matrice des vecteurs de RITZ ; ensuite :

$$\begin{aligned} \tilde{K} &= \psi^T K \psi = \psi^T F \\ \tilde{M} &= \psi^T M \psi \end{aligned}$$

ensuite on resout :

$$\tilde{K} X = R \tilde{M} X$$

pour déterminer : X et R, tels que

R = matrice diagonale des valeurs propres du système réduit

X = [$\{X_1\}$, $\{X_2\}$, ..., $\{X_q\}$] = matrice des vecteurs propres du même système

Les approximations des q premiers vecteurs propres sont :

$$\bar{\phi} = \psi \cdot X$$

(n*q) (n*q) (q*q)

4-4 CONCLUSION

L'étude dynamique d'une structure encastree à sa base suppose que le sol supportant cette structure a une rigidité infinie, les déplacements obtenus pour niveau auront une particularité, c'est d'être proportionnels entr eux, c'est à dire le déplacement du niveau i est proportionnel à celui du niveau $i+1$.

En réalité , l'hypothèse de la rigidité infinie du sol n'est pas toujours vérifiée , le sol a une rigidité finie en plus la structure doit reposer sur une fondation pour permettre à celle ci d'absorber une partie de l'énergie résultante de l'effet sismique sur la structure .

Dans les calculs pour la détermination de la réponse sismique d'une structure , en prenant en compte l'interaction sol-structure , on doit faire intervenir les paramètres de la fondation à savoir sa masse , sa rigidité et sa capacité d'amortissement .

les calculs ont montré que pour une même structure traitée dans les 2 cas , c'est à dire prise encastree au sol, ou reposant sur une fondation , les déplacements obtenus ;quoiqu'ils aient la même particularité à savoir la proportionnalité entre eux , ils étaient très différents dans les 2 cas numériquement , les déplacements obtenus pour une structure encastree à sa base étaient beaucoup plus petits que ceux obtenus pour une structure reposant sur une fondation ; en plus pour ce dernier cas et pour certaines accélérations du sol , les déplacements de la fondation étaient inférieurs par rapport aux plus petits déplacements des niveaux et ont un sens contraire , mais en somme ces déplacements étaient plus proches de la réalité .

INTERACTION SOL-STRUCTURE - GENERALITES

1- DEFINITION :

L'interaction sol-structure traduit la modification du mouvement du sol (ou de la structure) lors d'un seisme du fait de la presence de l'autre composant (structure ou sol), elle depend de la nature de sol , des caracteristiques de l'ouvrage et de son mode de fondation.

Les methodes d'analyse des reponses des structures incluant les effets de l'interaction sol-structure sont applicables pour des structures complexes idealisées par des systemes en éléments finis . Ces etudes sont imperieuses pour des ouvrages importants (barrages , centrales nucleaires , reservoirs G.N.L ,...) en considerant l'ouvrage une partie integrante d' un ensemble comprenant le sol et les structures avoisinantes .

2- IMPORTANCE DE LA PRISE EN COMPTE DE L'INTERACTION

Jusqu'à un certain temps , les structures etudiées etaient considerées rattachées à des fondations rigides et soumises à des charges laterales et leurs etudes dynamiques se faisaient par consequence .

La relation dynamique existant entre la reponse de la structure et les caracteristiques de sa fondation et son milieu est liées à un effet d' interaction , en effet ce phénomène est principalement du à un mecanisme d'echange d'energie entre la structure et le sol .

Les caracteristiques qui determinent le comportement d'une structure sous l'effet de chargement dynamique sont les masses des différents éléments , les rigidites des membres et la dissipation d'energie .

Pour analyser la reponse dynamique de la structure en prenant en compte le phenomène d'interaction , il est nécessaire d'incorporer les propriétés dynamiques appropriées du sol dans la formulation du problème global .

3- METHODES DE PRISE EN COMPTE DE L'INTERACTION

3-1 METHODES GLOBALES :

Ces methodes conduisent à une détermination simultanée du mouvement dans le sol et dans la structure , elles sont mieux adaptées pour l'etude des ouvrages enterrés .

Ces methodes peuvent facilement traiter des problèmes tridimensionnels , et sont susceptibles d'aprehender les comportements non lineaires dus à la loi de comportement d'un des matériaux (sol en general) et des interfaces sol-structure (decollement , ou glissement d'ouvrages sur leur fondation) .

Elles ont aussi la capacité de prendre en compte les hétérogénéités résultant soit des variations de faciés , soit des variations des caractéristiques du sol .

Les méthodes globales requièrent souvent moins de temps humain néanmoins , elles ont le désavantage de leur coût élevé pour le traitement des problèmes tridimensionnels ou pour l'utilisation de l'ordinateur .

3-2 METHODES DES SOUS STRUCTURE

3-2-1 Principe de superposition

Ce principe permet de fractionner un problème de détermination de la réponse dynamique d'une structure en prenant en compte le phénomène d'interaction sol-structure , et cela en trois étapes , la détermination de la solution de chaque étape contribuera à la solution globale :

1- Détermination du mouvement de la fondation rigide supposées sans masse .

2- Détermination des fonctions de rigidités du sous-sol .

3- Etude dynamique du bâtiment et de ses fondations liées par des ressorts et amortisseurs déterminés à la deuxième étape à un repère fixe soumis à un mouvement déterminé à la première étape .

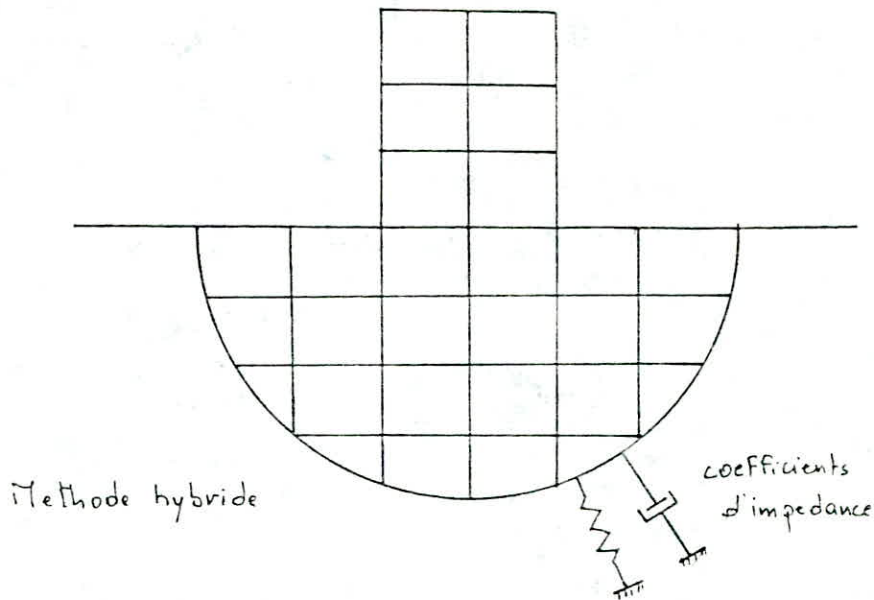
3-2-2 Définition des méthodes de sous structures

Ces méthodes font appel au principe de superposition , l'idée de base est d'analyser le problème d'interaction sol-structure en plusieurs étapes successives , chacune de ces étapes est telle qu'elle est facile à résoudre du point de vue de la modélisation ou du traitement . Ces méthodes sont particulièrement puissantes quand une partie du système (fondation par exemple) a une géométrie simple , alors que la structure requiert une analyse tridimensionnelle , elles ont l'avantage de pouvoir identifier la part relative à chaque composant contribuant au phénomène global d'interaction .

Les méthodes de sous structures se différencient par la décomposition en sous modèles du modèle global .

3-3 METHODES HYBRIDES

La résolution du problème d'impédance (voir chapitre IV) constitue une étape longue et coûteuse . GUPTA et AL (1980) ont développé une méthode hybride qui consiste à séparer le sol en un champ libre et un champ lointain (voir schéma) , ils ont résolu le problème à l'aide d'une méthode d'identification permettant de s'assurer que le modèle hybride redonne les impédances connues d'un disque circulaire en surface d'un demi-espace .



4- MISE EN OEUVRE DES CALCULS D'INTERACTION

4-1 MODELE DE COMPORTEMENT DU SOL

En pratique on se réfère au modèle viscoélastique linéaire équivalent dans le problème d'interaction sol-structure. Ce modèle a l'avantage de permettre la prise en compte des non-linéaires du comportement ; il est adapté à condition de choisir un module de cisaillement G et un pourcentage d'amortissement critique compatibles avec le niveau de déformation induit sous l'ouvrage.

4-2 NATURE ET DIRECTION DE PROPAGATION DE L'ONDE INCIDENTE

L'hypothèse admise dans ce cas est que les ondes sont planes, le mouvement horizontal du champ incident est créé par la propagation verticale des ondes de cisaillement et le mouvement vertical par la propagation verticale des ondes de compression.

5- CHOIX DE LA METHODE

la facilité d'emploi alliée à un coût moindre rend plus avantageux d'utiliser les méthodes de sous-structures par rapport aux méthodes globales, ce ceci est d'autant plus vrai si on a des ouvrages fondés en surface.

les méthodes de sous-structures présentent l'avantage de permettre certaines modifications sans qu'il soit nécessaire de reprendre toute l'analyse : une modification des caractéristiques de la structure ne requiert qu'une nouvelle analyse dynamique de la structure, ou une modification des caractéristiques du séisme du projet permet de conserver la solution du problème d'impédance.

FORMULATION D'UN PROBLEME D'INTERACTION SOL-STRUCTURE

1- GENERALITES

L'analyse complète d'interaction sol-structure doit prendre en compte :

- la variation des caractéristiques du sol avec la profondeur .
- Le comportement non lineaire du sol .
- Le caractère tridimensionnel du problème .
- Le schéma complexe de propagation des ondes qui engendrent le mouvement .
- L'intéraction avec les structures avoisinantes .

Pour plus de compréhension , des simplifications ont été introduites pour permettre un meilleur traitement du problème , elles concernent la schématisation du sol de fondation , la nature des ondes incidentes et autres .

2- METHODES DES SOUS STRUCTURES

2-1 INTRODUCTION

les méthodes de sous structures sont très utiles dans le cas de fondation rigide ou posée . En considérant séparément les equations de la structure et du sol dans le problème d'interaction sol structure d'une part et celles relatives au problème en champ libre c'est-à-dire du sol avec une excavation à l'emplacement de la structure d'autre part , et en écrivant qu'à l'interface les déplacements et efforts développés sont les meme , on obtient que les déplacements de la structure sont donnés par l'équation :

$$[M]*\{\ddot{U}\} + [C]*\{\dot{U}\} + [K]*\{U\} = - [M]*[B]*\{\ddot{U}_g\}$$

Les termes de l'équation seront définis en détail dans le sous chapitre (2-3) .

2-2 DEFINITION DE L'IMPEDANCE D'UNE FONDATION

A)- Introduction

Une bonne compréhension des méthodes de sous structures nécessite un approfondissement de la théorie des vibration des massifs de fondations , en effet une exploitation des résultats obtenus dans le domaine des vibrations des fondations permet de mieux comprendre et déterminer la réponse des ouvrages supportés par ces fondations .

B)- Definition

Considerant une fondation de forme quelconque reposant à la surface d'un milieu semi-infini et soumise à une sollicitation

harmonique $P_0 e^{i\omega t}$, outre les sollicitations appliquées, les forces s'exerçant sur la fondation sont les forces d'inertie et les forces de réaction du sol $R(t)$, il en résulte un déplacement $Z_0 e^{i\omega t}$ de la fondation.

associons à la fondation réelle une fondation fictive de mêmes caractéristiques géométriques mais de masse nulle, soit $Z(t)$ son déplacement. Lorsqu'elle est soumise à la force appliquée $P(t)$, par définition on appelle impédance de la fondation le quotient de la force appliquée au déplacement de la fondation sans masse.

$$K = \frac{P(t)}{Z(t)} \quad (1)$$

Les forces d'inertie de la fondation étant nulles, l'impédance est égale au quotient de la réaction $R(t)$ exercée par le sol sur la fondation au déplacement de celle-ci :

$$K = \frac{R(t)}{Z(t)} \quad (2)$$

Dans le cas d'une fondation partiellement enterrée la réaction $R(t)$ se compose des efforts développés sous la base de la fondation et des efforts développés le long des faces latérales au contact avec le sol.

A partir de l'équation (1) on peut définir une impédance de la fondation pour les modes de translation (horizontale ou verticale), de balancement, ou de torsion. Notons que l'application d'une force horizontale donnant naissance à la fois à un déplacement horizontal et à une rotation, il existe également une impédance couplée rotation-déplacement horizontal celle-ci se définit comme le rapport de la force (ou du moment) appliquée à la rotation (ou au déplacement horizontal) résultant.

C) Impédance d'un oscillateur simple à 1 DDL

La considération d'un oscillateur simple à 1 degré de liberté est utile pour la compréhension de la forme générale prise par les fonctions d'impédances. L'équation d'équilibre dynamique d'un tel oscillateur de caractéristiques m, c, k sous à une sollicitation harmonique s'écrit :

$$m \ddot{z} + c \dot{z} + k z = P e^{i\omega t}$$

La solution générale :

$$z(t) = \frac{P e^{i\omega t}}{(k - m\omega^2) + i\omega c}$$

donc

$$K = (k - m \omega^2) + i c \omega \quad (\text{en tenant compte de l'équation (1)})$$

K se compose d'une partie réelle $K_1(\omega)$ est d'une partie imaginaire $K_2(\omega)$, dépendant toutes les deux de la pulsation de sollicitation. Le déplacement est la somme d'une partie en phase avec la sollicitation qui traduit les caractéristiques de raideur et d'inertie du système et d'une partie déphasée de 90 degrés qui traduit les caractéristiques d'amortissement, en faisant intervenir

$$\omega_n = (k/m)^{1/2} \quad \text{pulsation propre}$$

$$\lambda = e/2/(k m)^{1/2} \quad \text{pourcentage d'amortissement critique}$$

$$K = K [1 - (\omega/\omega_n)^2 + i 2 \lambda \omega / \omega_n]$$

Cette écriture de K montre que l'impédance peut s'exprimer sous la forme d'un produit de la raideur statique K par un nombre complexe $(K_1 + i \omega c_1)$ qui regroupe les caractéristiques dynamiques du système, on le dénomme impédance dynamique.

D) Forme générale de l'impédance d'une fondation

Les considérations précédentes relatives à l'oscillateur simple à un degrés de liberté, suggèrent que de façon générale, le déplacement d'une fondation soumis à une sollicitation harmonique peut être décomposé suivant une composante en phase avec la sollicitation et une composante déphasée de 90 degrés :

$$z = p_0 (f_1 + i f_2) e^{i \omega t}$$

Il en résulte que l'impédance s'écrit sous la forme :

$$K = \tilde{K}_1 + i \tilde{K}_2$$

avec

$$\tilde{K}_1 = f_1 / (f_1^2 + f_2^2) \quad \text{et} \quad \tilde{K}_2 = -f_2 / (f_1^2 + f_2^2)$$

Il est souvent intéressant de formuler l'expression de l'impédance en faisant ressortir comme pour l'oscillateur simple la partie statique K :

$$K = K (K_1 + i K_2) \quad (3)$$

Pour la présentation des résultats donnant les variations des fonctions d'impédance avec la fréquence, il est utile d'introduire une fréquence adimensionnelle a_0 définie par :

$$a_0 = \omega r_0 / v_s$$

où r_0 désigne une dimension caractéristique de la fondation (rayon pour la fondation circulaire, demi-largeur pour les semelles filantes), et v_s une valeur caractéristique de la vitesse de propagation des ondes de cisaillement dans le demi-espace. Donc K s'écrira

$$K = K (k_1 + i a_0 c_1)$$

où k_1 et c_1 sont les paramètres adimensionnels variant avec la fréquence adimensionnelle a_0 .

Lorsque le sol de fondation présente un amortissement matériel, l'impédance est souvent écrite de façon à isoler l'influence de cet amortissement sous la forme suivante :

$$K = K (K'_1 + i a_0 c'_1) (1 + 2 i \beta) \quad (4)$$

Cette formulation est intéressante pour un demi-espace ou pour un milieu dont les propriétés varient lentement avec la profondeur, les valeurs de K'_1 et C'_1 sont pratiquement indépendantes de β . Il suffit de les calculer pour $\beta = 0$ (milieu élastique)

E) Analogie entre le semi-espace et l'oscillateur simple

Considérons le cas d'une fondation rigide, de rayon r , posée à la surface d'un demi-espace élastique, homogène, isotrope. d'après l'équation (3), son impédance pour une sollicitation verticale, s'écrit :

$$K = \frac{4 G r_0}{1 - \nu} (K_1 + i K_2) \quad (5)$$

La réaction du sol sous la fondation a pour expression

$$(6) \quad R(t) = K Z(t) = \frac{4 G r_0}{1 - \nu} (K_1 + i K_2) Z(t)$$

Notant que pour une sollicitation harmonique :

$$\dot{Z} = i \omega Z(t)$$

L'équation (6) peut se transformer en :

$$R(t) = \frac{4 G r_0}{1 - \nu} K_1 Z(t) + \frac{4 G r_0}{1 - \nu} \frac{K_2}{\omega} \dot{Z}(t)$$

et l'équation dynamique d'équilibre de la fondation de masse m s'écrit alors :

$$m \ddot{Z} + \frac{4 G r_0}{1 - \nu} \frac{K_z}{\omega} \dot{Z} + \frac{4 G r_0}{1 - \nu} K_s Z = P(t)$$

Cette équation est l'équation d'un oscillateur simple à 1 degré de liberté. Le mouvement de sa fondation est celui d'une masse m (masse de fondation) posée sur un ressort et un amortisseur de caractéristique :

$$\bar{K} = \frac{4 G r_0 K_s}{1 - \nu}$$

$$\bar{C} = \frac{4 G r_0}{1 - \nu} \frac{K_z}{\omega}$$

Ce ressort et cet amortisseur représentent, le semi-espace sous jacent. Ces caractéristiques qui dépendent en fréquence, incluant les effets de masse, raideur et éventuellement amortissement matériel au semi-espace.

La partie réelle de l'impédance représente les effets d'inertie et de raideur.

F) Application des facteurs d'impédance

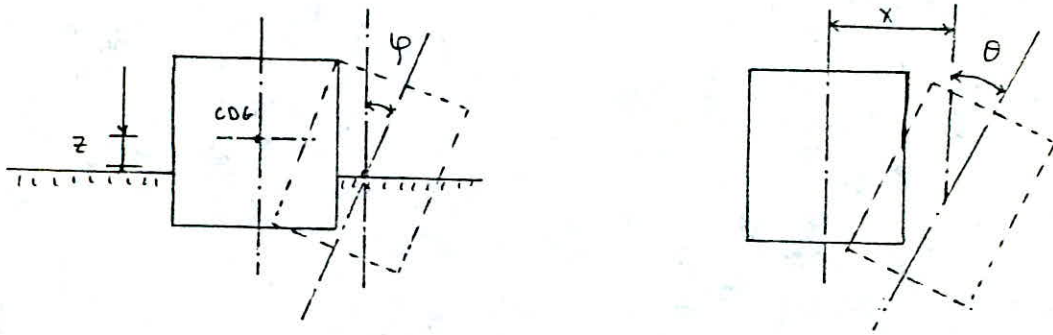
Pour un massif de fondation rigide présentant deux plans de symétrie verticaux, les degrés de liberté associés à la translation verticale et à la torsion autour d'un axe vertical sont découplés, par outre les degrés de liberté associés au balancement d'un axe horizontal et à la translation horizontale sont couplés.

Les équations d'équilibre d'un tel massif sont en prenant les axes au centre de parité de massif

$$\begin{array}{rcl} m \ddot{z} + R_z(t) = P_z(t) & & 7 \text{ a} \\ m \ddot{x} + R_x(t) = P_x(t) & & 7 \text{ b} \\ I_x \ddot{\varphi} + R_\varphi(t) - R_x(t) z_c = M \dot{x}(t) & & 7 \text{ c} \\ I_z \ddot{\theta} + R_\theta(t) = M \ddot{\theta}(t) & & 7 \text{ d} \end{array}$$

où m = masse du massif
 I_z, I_x = moments d'inertie autour d'un axe vertical horizontal.
 z, x = déplacement vertical, horizontal du centre gravité.

- θ, φ = rotation autour d'un axe vertical, horizontal passant par le centre de gravité
 $R(t)$ = réaction du sol au centre de gravité géométrique de la surface de contact
 φ, M = sollicitation (forces, mouvements) agissant au centre de gravité.



Par définition de l'impédance les réactions $\{R\}$ sont reliées aux déplacements $\{V\}$ du centre de gravité de la surface de contact par :

$$\{R\} = [K] \{V\}_c$$

où $[K]$ désigne la matrice d'impédance, formée de termes complexes :

$$K = \begin{bmatrix} K_z & 0 & 0 & 0 \\ 0 & K_x & K_{x\phi} & 0 \\ 0 & K_{x\phi} & K_{\phi\phi} & 0 \\ 0 & 0 & 0 & K_\theta \end{bmatrix} \quad (8)$$

En prenant comme inconnues les déplacements $\{V\}$ du centre de gravité :

$$\{V\} = \{V\}_c + \begin{bmatrix} 0 \\ z_c \phi \\ 0 \\ 0 \end{bmatrix}$$

On a la relation:

$$\{R\} = [K_1] \{V\}$$

où $[K_1]$ est une matrice dérivée de la matrice de l'impédance :

$$[K_1] = \begin{bmatrix} K_z & 0 & 0 & 0 & 0 \\ 0 & K_x & K_{x\phi} & -K_x z_c & 0 \\ 0 & K_{x\phi} & K_{\phi\phi} & -K_{x\phi} z_c & 0 \\ 0 & 0 & 0 & 0 & K_\theta \end{bmatrix}$$

Les équations de mouvement (20) s'écrivent alors sous la forme matricielle :

$$[M] \{\ddot{V}\} + [K^*] \{V\} = \{\varphi\}$$

avec :

$$M = \begin{bmatrix} m & 0 & 0 & 0 \\ 0 & m & 0 & 0 \\ 0 & 0 & I_x & 0 \\ 0 & 0 & 0 & I_y \end{bmatrix}$$

et :

$$[K^*] = \begin{bmatrix} K_z & 0 & 0 & 0 & 0 \\ 0 & K_x & K_x \phi & -K_x Z_c & 0 \\ 0 & K_x \phi & -K_x Z_c & K_x \phi & -2 K_x \phi Z_c \\ 0 & 0 & 0 & 0 & +K_x Z_c^2 \\ & & & & K_\theta \end{bmatrix} \quad (9)$$

Pour une sollicitation harmonique $\varphi_c(i \omega t)$, la solution stationnaire est solution de l'équation :

$$[[K^*] - \omega^2 [M]] \{V\} = \{\varphi_c\}$$

La solution de l'équation (9) est aisée à obtenir, d'autant que 2 degrés de liberté seulement sont couplés, la seule difficulté réside dans la détermination de la matrice d'impédance $[K]$ (équation 8).

2-3 METHODE DE SOUS STRUCTURE

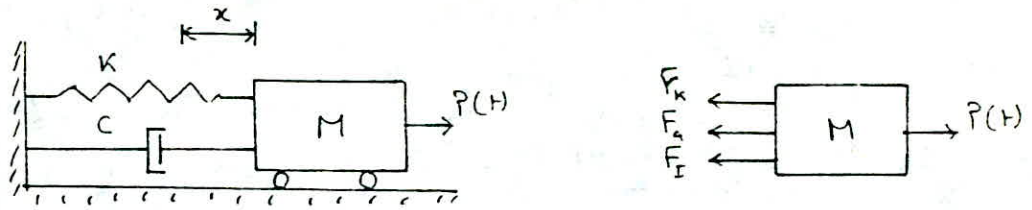
2-3-1 Formulation des équations mathématiques

La formulation des équations mathématiques sous entend l'application des lois physiques pour décrire le mouvement dans un langage mathématique. Plusieurs principes existent dans ce cas, le principe d'ALEMBERT, le principe de HAMILTON, et celui des travaux virtuels.

A) principe d'ALEMBERT

Ce principe est basé sur les lois physiques de l'équilibre des forces. Il stipule que d'après la loi de l'équilibre des forces, la force excitatrice $P(t)$ doit être équilibrée par la somme des forces d'inertie, de rappel, et d'amortissement dans le cas où il y a présence de moyen de dissipation d'énergie ou un mécanisme d'amortissement.

Considérant un système à un seul degré de liberté schématisé comme suit :



L'équilibre des forces donne :

$$F_i + F_a + F_k = P(t)$$

F_i = force d'inertie
 F_a = force d'amortissement
 F_k = force de rappel

Les trois forces sont définies comme suit :

* Relation entre force et déplacement : x (contraction ou elongation)

$$F_k = K x$$

* Cas de présence de moyen d'amortissement

$$F_a = C \dot{x}$$

C = constante d'amortissement

\dot{x} = vitesse de déplacement

* relation entre force et masse , quand celle ci est écartée de sa position initiale

$$F_i = M \ddot{x}$$

M = masse du corps considéré

\ddot{x} = accélération du corps

L'équation s'écrira :

$$M \ddot{x} + C \dot{x} + k x = P(t)$$

B) Autres principes

- Principe de HAMILTON

Il exprime que la somme de la variation d'énergie cinétique et potentielle , et de la variation du travail effectué par les forces non conservatrices pendant un intervalle de temps Δt est nulle.

L'énergie cinétique est donnée par :

$$E_c = 1/2 M \cdot \dot{x}^2$$

L'énergie potentielle est donnée par

$$E_p = 1/2 K x^2$$

Les forces non conservatrices sont la charge appliquée $P(t)$ et la force d'amortissement F_a , la variation de leurs travaux est donnée par :

$$\sum W_{Nc} = (P(t) - c \dot{x}) \int dx$$

L'application du principe donne :

$$\int_{t_1}^{t_2} [\delta(Ec - Ep) + \delta W_{nc}] dt = 0$$

$$\int_{t_1}^{t_2} [m \ddot{x} \delta x - k x \delta x - c \dot{x} \delta x + P(t) \delta x] dt = 0$$

Considérons le terme sous l'intégrale ($m \ddot{x} \delta x$) :

$$\int_{t_1}^{t_2} m \dot{x} \delta \dot{x} dt = \int_{t_1}^{t_2} m \dot{x} \frac{d(\delta x)}{dt} dt = m \dot{x} \delta x \Big|_{t_1}^{t_2} - \int_{t_1}^{t_2} m \ddot{x} \delta x dt$$

L'hypothèse de HAMILTON selon laquelle δx s'annule aux bornes t_1 et t_2 donne :

$$\int_{t_1}^{t_2} m \dot{x} \delta \dot{x} dt = - \int_{t_1}^{t_2} m \ddot{x} \delta x dt$$

D'où l'équation en général s'écrira :

$$\int_{t_1}^{t_2} [-m \ddot{x} - c \dot{x} - k x + P(t)] \delta x dt = 0$$

δx étant en général arbitrairement différent de 0, on aura :

$$-m \ddot{x} - c \dot{x} - k x + P(t) = 0$$

Cela donnera l'équation du mouvement suivante :

$$m \ddot{x} + c \dot{x} + k x = P(t)$$

- Principe des travaux virtuels :

Ce principe est utilisé pour n'importe quel problème dynamique mais particulièrement effectif pour des corps rigides ou éléments continus .

Si on applique un déplacement virtuel δx à une masse M , chacune des forces (ou contraintes) du système fournit un travail la somme de leurs travaux doit être égale au travail de la force excitatrice :

$$\delta x F_i + \delta x F_a + \delta x F_k = \delta x P(t)$$

$$\delta x [m \ddot{x} + c \dot{x} + k x] = \delta x P(t)$$

$\delta x \neq 0$ (arbitrairement), l'équation du mouvement sera :

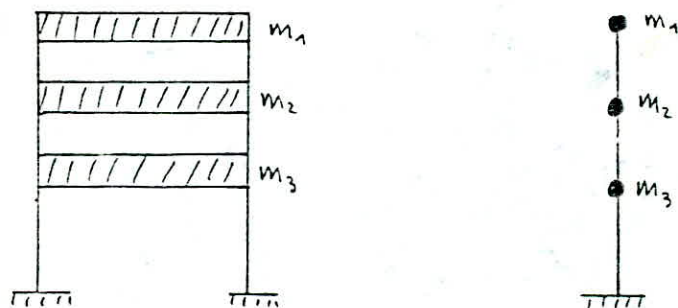
$$m \ddot{x} + c \dot{x} + k x = P(t)$$

2-3-2 Modélisation

Avant de déterminer une réponse dynamique d'une structure, il faut définir un modèle analytique, en effet ce point détermine le mode de modélisation de la structure, cette dernière peut être soit continue, soit discrétisée (fig suivante), mais en dynamique de structures l'analyse est souvent compliquée par le fait que les forces d'inertie résultent des déplacements structuraux, qui sont à leur tour influencés par la magnitude de ces forces, ce qui donne à résoudre le problème en termes d'équations différentielles.

Or la masse est généralement répartie, en même temps les déplacements et accélérations doivent être définis pour chaque point de la structure le long des axes où les forces d'inertie sont définies. L'analyse du problème devient non impossible, mais très compliquée.

Mais si la masse est concentrée en une série de points discrets, le problème analytique devient de ce fait très simplifiée, car les forces d'inertie peuvent être développées seulement au niveau de ces points discrets.

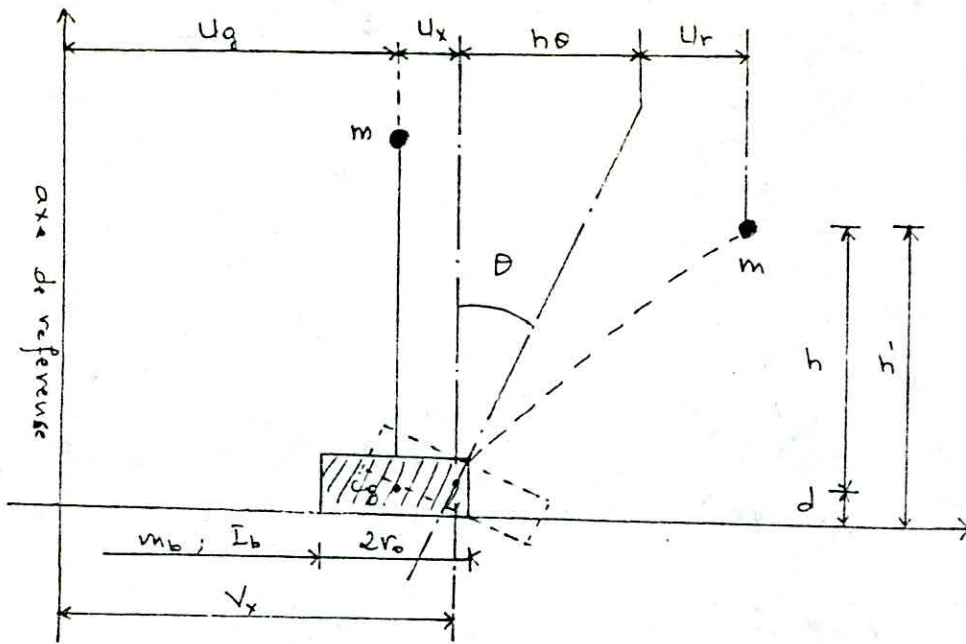


2-3-3 Formulation d'un problème d'interaction

a- Equation du mouvement

On commencera par l'étude d'une structure à un seul degré de liberté sur un sol déformable; cette structure est constituée d'un oscillateur simple dont le seul degré de liberté est un déplacement horizontal. Le contact avec le sol se fait par le biais d'une fondation circulaire rigide, le système ainsi constitué possède 3 degrés de liberté :

- Mouvement horizontal de la masse de la structure.
- Mouvement horizontal de la fondation
- Mouvement de balancement de la fondation



L'équation de mouvement s'écrit dans ce cas comme suit :

$$[m]\{\ddot{u}\} + [c]\{\dot{u}\} + [k]\{u\} = \{p\} \quad (1)$$

$[m]$ = matrice masse incluant la masse de la fondation et celle de la structure .

$[c]$ = matrice d'amortissement .

$[k]$ = matrice de rigidité .

$\{u\}$ = vecteur des déplacements nodaux du système relatifs au mouvement du seisme .

$\{p\}$ = vecteur force excitatrice .

Les matrices masse, rigidité, et amortissement du système sol-structure se décomposent suivant les degrés de liberté de la structure et de sa fondation .

Le vecteur $\{\ddot{v}\}$ des accélérations peut s'écrire tel que :

$$\{\ddot{v}\} = \{\ddot{u}\} + [B] \{\ddot{u}_g\}$$

où :

$\{\ddot{v}\}$ = vecteur accélération absolu du système sol-structure

$\{\ddot{u}_g\}$ = vecteur accélération du mouvement sismique .

$[B]$ = matrice de dimension $(N \times 3)$ caractérisant la distribution des composantes sismiques aux accélérations des noeuds du système .

L'équation (1) peut s'écrire dans ce cas là :

$$[m]\{\ddot{v}\} + [c]\{\dot{u}\} + [k]\{u\} = 0 \quad (2)$$

avec :

$$\{p\} = - [m] [B] \{\ddot{u}_g\}$$

D'où une réécriture de l'équation (1) :

$$[m]\{\ddot{u}\} + [c]\{\dot{u}\} + [k]\{u\} = - [m][B]\{\ddot{u}_g\} \quad (3)$$

b- Développement des matrices

La matrice [B] se décompose en 2 parties suivant les degrés de liberté de la structure et ceux de la fondation :

$$[B] = \begin{bmatrix} B_s \\ \hline B_b \end{bmatrix}$$

s : indice pour la structure (noeuds)

b : indice pour fondation (noeuds)

$$[m] = \begin{bmatrix} [M_{ss}] & [M_{sb}] \\ \hline [M_{sb}]^T & [M_{bb}] \end{bmatrix}$$

[M_{ss}] , [M_{sb}] , [M_{bb}] sont déterminées à partir des caractéristiques de la structure et de la fondation .

$$[k] = \begin{bmatrix} [K_{ss}] & [K_{sb}] \\ \hline [K_{sb}]^T & [K_{bb}] + [K_{bb}^{F(\omega)}] \end{bmatrix}$$

$$[c] = \begin{bmatrix} [C_{ss}] & [C_{sb}] \\ \hline [C_{sb}]^T & [C_{bb}] + [C_{bb}^{F(\omega)}] \end{bmatrix}$$

[K_{bb}^{F(ω)}] et [C_{bb}^{F(ω)}] représentent la partie réelle et imaginaire de la matrice impédance de la fondation .

Les fonctions d'impédance sont définies pour la zone de contact de la fondation avec le sol , en général ces fonctions d'impédance interviennent dans les matrices [K_{bb}^{F(ω)}] et [C_{bb}^{F(ω)}] .

Le vecteur déplacement {u} peut aussi être décomposé suivant les degrés de liberté de la structure et de sa fondation telque :

$$\{u\} = \begin{bmatrix} U_s \\ \hline U_b \end{bmatrix}$$

c- Définition des paramètres de l'interaction

Fonctions d'impédance d'une fondation circulaire :

$$K_{xx} = \frac{8 G r_0}{2 - \nu} K_{11}$$

$$C_{xx} = \frac{8 \int V_s r_0}{2 - \nu} C_{11}$$

$$K_{x\theta} = \frac{8 G r_o}{2 - \nu} K_{21}$$

$$K_{\theta\theta} = \frac{8 G r_o}{3 (1 - \nu)} K_{22}$$

$$C_{x\theta} = \frac{8 \rho V_s r_o}{2 - \nu} C_{21}$$

$$C_{\theta\theta} = \frac{8 \rho V_s r_o}{3 (1 - \nu)} C_{22}$$

r_o = rayon de la fondation
 ρ = masse volumique du sol
 ν = coefficient de POISSON
 V_s = vitesse de propagation de l'onde incidente

3- PROJET

PROGRAMMATON

OBJET DU PROGRAMME.

Ce programme est destiné à calculer les déplacements des différents niveaux d'une Structure, encastrée ou avec fondation, en adoptant les fonctions suivantes:

- . Calcul de la matrice K_{ss}
- . Recherche des valeurs propres avec la méthode de RUTHISHAUSER
- . Recherche des vecteurs propres
- . Calcul de la matrice C_{ss} avec la méthode de RAYLEIGH-RITZ

A ce stade, on commence à transformer les matrices:

C_{ss} , K_{ss} et M_{ss} ,

pour les rendre diagonales, en utilisant la matrice des vecteurs propres et sa transposée normalisée.

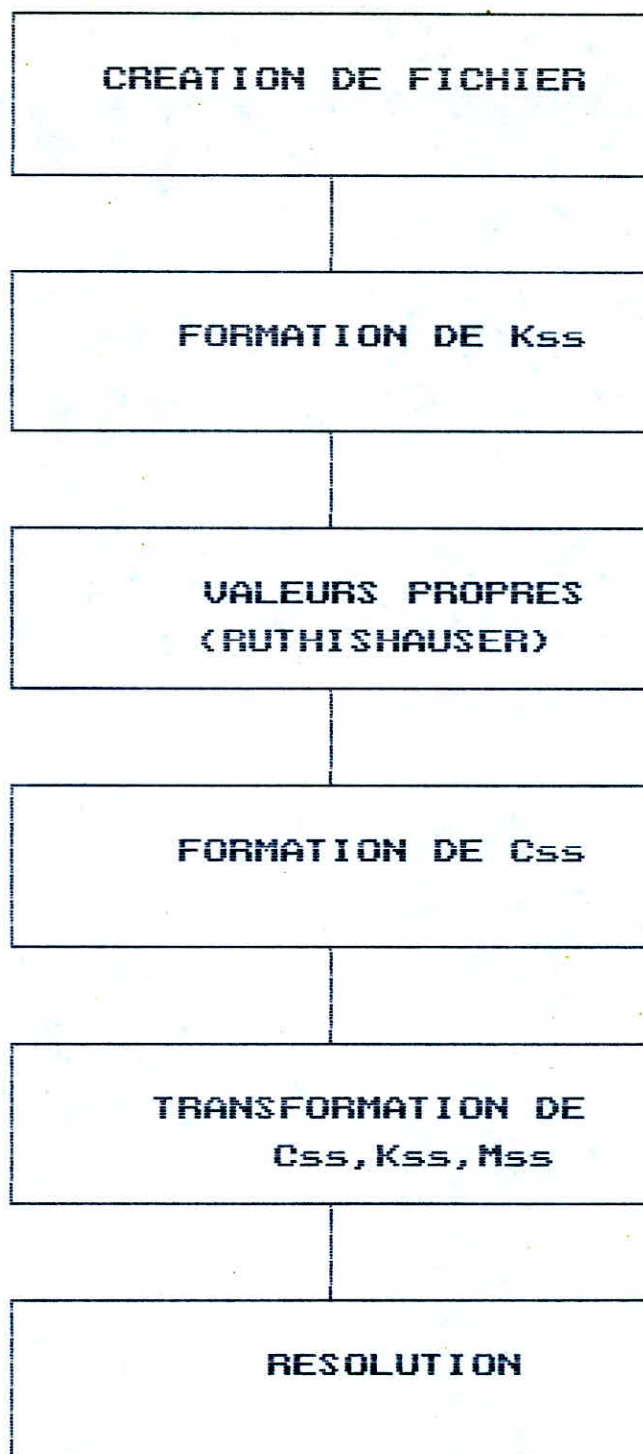
A partir de ce point, on introduit l'interaction sol-structure, en utilisant les matrices:

K_{sb} , K_{bs} , K_{bb} , C_{sb} , C_{bs} , C_{bb} , M_{bs} , M_{sb} , M_{bb} .

Finalement, on s'attaque à la résolution des équations dans le domaine des temps, en utilisant la méthode de WILSON- θ .

Les résultats sont obtenus sous forme de tableaux et de graphes, donnant les déplacements des niveaux, en fonction des accélérations, et figurant en Annexes:

- . ANNEXE A et C : Cas de Structure encastrée
- . ANNEXE B et D : Cas de Structure avec fondation.



ANNEXE A

**TABLEAUX DES DEPLACEMENTS DES NIVEAUX
EN FONCTION DES ACCELERATIONS
(STRUCTURE ENCASTREE)**

TABEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 0.00277293 | 0.0027436 | 0.0024651 | -42.264 |
| 0.01896921 | 0.0186285 | 0.0161129 | -36.642 |
| 0.04865593. | 0.0468450 | 0.0371818 | -24.285 |
| 0.08644770 | 0.0802429 | 0.0565578 | -9.979 |
| 0.12563856 | 0.1099109 | 0.0668566 | -0.621 |
| 0.16034488 | 0.1286804 | 0.0662453 | -1.925 |
| 0.18750205 | 0.1347848 | 0.0595159 | -16.327 |
| 0.20833892. | 0.1340643 | 0.0561545 | -44.616 |
| 0.22985372 | 0.1401685 | 0.0672611 | -88.817 |
| 0.26550485 | 0.1719112 | 0.1024036 | -132.674 |
| 0.33060513 | 0.2445751 | 0.1639646 | -158.848 |
| 0.43652077 | 0.3615243 | 0.2444369 | -172.074 |
| 0.58748274. | 0.5120160 | 0.3299017 | -152.083 |
| 0.77233050 | 0.6681899 | 0.4002042 | -96.127 |
| 0.96263992 | 0.7912731 | 0.4345477 | -50.391 |
| 1.12165405 | 0.8481909 | 0.4231840 | 14.421 |
| 1.20127029 | 0.8120904 | 0.3610825 | 101.379 |
| 1.14899120. | 0.6662758 | 0.2466869 | 146.042 |
| 0.93390864 | 0.4208027 | 0.0954462 | 129.115 |
| 0.56138374 | 0.1140311 | -0.0608840 | 91.098 |
| 0.06774934 | -0.2054339 | -0.1927650 | 53.548 |
| -0.48722727 | -0.4942886 | -0.2850384 | 16.666 |
| -1.02736938 | -0.7213988 | -0.3368609 | -14.048 |
| -1.47349093 | -0.8717332 | -0.3579209 | -21.076 |
| -1.76262361 | -0.9487716 | -0.3651688 | -0.073 |
| -1.86451467 | -0.9716197 | -0.3777246 | 61.569 |
| -1.79243325 | -0.9700046 | -0.4128980 | 139.218 |
| -1.59574762 | -0.9700046 | -0.4757691 | 185.426 |
| -1.33992321 | -0.9790176 | -0.5507550 | 214.420 |
| -1.09363870 | -0.9889516 | -0.6121509 | 223.663 |
| -0.91322141 | -0.9834377 | -0.6361391 | 220.061 |
| -0.82958881 | -0.9471923 | -0.6102725 | 198.762 |
| -0.83952485 | -0.8718303 | -0.5354976 | 162.240 |
| -0.90753431 | -0.7591476 | -0.4244537 | 121.367 |
| -0.97860054 | -0.6214355 | -0.2981085 | 82.104 |
| -0.99475820 | -0.4759192 | -0.1789118 | 37.177 |
| -0.90972854 | -0.3352417 | -0.0821331 | -2.312 |
| -0.70294693 | -0.2036136 | -0.0134628 | -31.231 |
| -0.38505106 | -0.0764787 | 0.0309851 | -53.959 |
| 0.00789869 | 0.0578174 | 0.0641106 | -76.495 |
| 0.42718805 | 0.2135596 | 0.1046816 | -99.751 |
| 0.82478296 | 0.4004764 | 0.1702635 | -114.209 |
| 1.16306437 | 0.6166209 | 0.2687148 | -128.433 |
| 1.42274575 | 0.8481269 | 0.3956264 | -136.854 |
| 1.60159594 | 1.0701543 | 0.5332407 | -129.614 |
| 1.70660895 | 1.2499442 | 0.6530666 | -113.212 |
| 1.74637000 | 1.3545802 | 0.7249436 | -82.815 |
| 1.72317968 | 1.3579292 | 0.7259404 | -56.866 |
| 1.63366875 | 1.2509167 | 0.6512553 | -54.008 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 1.47373170 | 1.0479901 | 0.5185374 | -62.194 |
| 1.24095991 | 0.7823361 | 0.3592183 | -82.008 |
| 0.94151771 | 0.4989025 | 0.2085381 | -115.710 |
| 0.59745390 | 0.2457079 | 0.0968101 | -153.147 |
| 0.24792809 | 0.0625455 | 0.0414855 | -189.215 |
| -0.05438721 | -0.0268104 | 0.0448292 | -221.080 |
| -0.25249916 | -0.0174951 | 0.0962848 | -236.368 |
| -0.29966769 | 0.0771168 | 0.1763235 | -239.888 |
| -0.17153010 | 0.2325318 | 0.2639095 | -225.405 |
| 0.12331761 | 0.4192166 | 0.3407692 | -188.467 |
| 0.53861721 | 0.6062049 | 0.3926870 | -120.672 |
| 0.99372923 | 0.7616127 | 0.4086465 | -32.045 |
| 1.38952834 | 0.8559272 | 0.3833986 | 46.890 |
| 1.63203216 | 0.8675886 | 0.3210488 | 123.920 |
| 1.64872872 | 0.7814546 | 0.2293102 | 180.550 |
| 1.40530694 | 0.5926427 | 0.1176393 | 200.113 |
| 0.91545215 | 0.3110373 | -0.0036572 | 192.183 |
| 0.23678456 | -0.0402780 | -0.1275449 | 158.871 |
| -0.53990764 | -0.4271474 | -0.2502960 | 109.933 |
| -1.30744312 | -0.8088427 | -0.3694806 | 56.985 |
| -1.96155223 | -1.1441075 | -0.4813090 | 11.502 |
| -2.41862659 | -1.3970960 | -0.5787168 | -18.825 |
| -2.62798487 | -1.5413765 | -0.6508288 | -35.322 |
| -2.57706967 | -1.5619975 | -0.6846471 | -23.782 |
| -2.29304746 | -1.4597529 | -0.6717987 | 11.428 |
| -1.83528458 | -1.2514113 | -0.6120022 | 63.072 |
| -1.28306249 | -0.9680997 | -0.5140832 | 129.651 |
| -0.72253815 | -0.6527606 | -0.3953035 | 190.153 |
| -0.23137086 | -0.3521908 | -0.2755252 | 239.203 |
| 0.13133188 | -0.1097145 | -0.1731897 | 264.984 |
| 0.33200219 | 0.0434667 | -0.1010723 | 261.401 |
| 0.36448091 | 0.0943086 | -0.0644610 | 238.563 |
| 0.24570682 | 0.0478687 | -0.0631928 | 198.392 |
| 0.01111955 | -0.0746513 | -0.0920909 | 146.143 |
| -0.29225517 | -0.2420706 | -0.1424823 | 107.975 |
| -0.61630590 | -0.4238248 | -0.2065029 | 72.515 |
| -0.91472265 | -0.5922831 | -0.2740918 | 39.320 |
| -1.14737305 | -0.7250131 | -0.3331228 | 23.990 |
| -1.28784964 | -0.8090420 | -0.3746325 | 22.972 |
| -1.32542853 | -0.8397048 | -0.3940098 | 27.059 |
| -1.26284930 | -0.8169842 | -0.3894206 | 31.299 |
| -1.11356338 | -0.7437968 | -0.3610828 | 39.115 |
| -0.89968772 | -0.6271612 | -0.3121718 | 50.012 |
| -0.64813453 | -0.4784658 | -0.2481786 | 55.727 |
| -0.38499346 | -0.3113546 | -0.1744446 | 55.891 |
| -0.13182196 | -0.1397939 | -0.0953028 | 43.929 |
| 0.09789640 | 0.0255641 | -0.0128879 | 16.526 |
| 0.30068907 | 0.1805426 | 0.0731674 | -28.156 |
| 0.48419309 | 0.3297934 | 0.1660703 | -100.918 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 0.66701970 | 0.4871306 | 0.2718895 | -168.600 |
| 0.86804903 | 0.6644965 | 0.3909059 | -211.673 |
| 1.09873646 | 0.8640399 | 0.5147758 | -250.795 |
| 1.36324909 | 1.0793877 | 0.6331737 | -255.681 |
| 1.64976919 | 1.2901350 | 0.7315025 | -225.732 |
| 1.92930826 | 1.4653255 | 0.7942168 | -193.675 |
| 2.16509905 | 1.5771112 | 0.8144052 | -164.420 |
| 2.31801766 | 1.6075498 | 0.7938500 | -126.397 |
| 2.35126308 | 1.5499555 | 0.7382036 | -114.989 |
| 2.24595022 | 1.4164969 | 0.6611053 | -138.768 |
| 2.00985298 | 1.2364573 | 0.5819953 | -171.050 |
| 1.67354236 | 1.0430413 | 0.5155839 | -201.131 |
| 1.28450099 | 0.8631050 | 0.4668218 | -222.081 |
| 0.89903654 | 0.7120787 | 0.4318033 | -234.207 |
| 0.57197056 | 0.5939537 | 0.4020668 | -228.304 |
| 0.34307639 | 0.5023732 | 0.3671056 | -197.377 |
| 0.22651126 | 0.4242436 | 0.3169870 | -153.893 |
| 0.21030398 | 0.3480017 | 0.2482132 | -114.676 |
| 0.26278804 | 0.2702332 | 0.1672867 | -75.787 |
| 0.33993407 | 0.1943251 | 0.0866361 | -41.971 |
| 0.39715180 | 0.1275183 | 0.0200684 | -19.404 |
| 0.40180694 | 0.0774995 | -0.0211015 | -6.992 |
| 0.34080744 | 0.0481222 | -0.0321288 | -1.805 |
| 0.22209532 | 0.0368286 | -0.0169573 | -1.543 |
| 0.07063857 | 0.0353659 | 0.0130326 | -5.862 |
| -0.07987959 | 0.0330474 | 0.0428904 | -7.404 |
| -0.19903479 | 0.0191324 | 0.0574028 | 3.129 |
| -0.27140019 | -0.0164173 | 0.0434371 | 35.111 |
| -0.30495466 | -0.0843056 | -0.0091633 | 101.384 |
| -0.33371214 | -0.1984056 | -0.1077340 | 188.694 |
| -0.40713106 | -0.3711587 | -0.2515170 | 256.220 |
| -0.57052542 | -0.6038795 | -0.4251990 | 310.997 |
| -0.85445280 | -0.8874084 | -0.6062854 | 345.663 |
| -1.26277059 | -1.2005640 | -0.7707548 | 320.147 |
| -1.75813356 | -1.5033600 | -0.8912398 | 244.457 |
| -2.26762477 | -1.7462143 | -0.9465956 | 186.401 |
| -2.70768135 | -1.8930043 | -0.9383259 | 141.528 |
| -2.99560858 | -1.9243506 | -0.8819971 | 63.890 |
| -3.05402405 | -1.8279802 | -0.7873020 | -2.168 |
| -2.83511868 | -1.6060099 | -0.6613676 | -24.424 |
| -2.34169983 | -1.2810884 | -0.5163618 | 3.969 |
| -1.63238047 | -0.8938101 | -0.3703066 | 71.677 |
| -0.81131639 | -0.4946546 | -0.2421709 | 155.477 |
| -0.00540427 | -0.1328727 | -0.1440662 | 215.875 |
| 0.66678606 | 0.1567691 | -0.0734088 | 228.710 |
| 1.11977865 | 0.3595089 | -0.0154530 | 223.328 |
| 1.30928646 | 0.4725775 | 0.0411514 | 195.658 |
| 1.23753732 | 0.5012116 | 0.0973949 | 160.492 |
| 0.94869190 | 0.4538676 | 0.1424432 | 112.487 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 0.51947276 | 0.3422127 | 0.1612561 | 58.635 |
| 0.04265014 | 0.1815897 | 0.1429459 | -0.759 |
| -0.38935576 | -0.0052256 | 0.0890573 | -79.846 |
| -0.69673921 | -0.1829750 | 0.0183768 | -154.144 |
| -0.82911816 | -0.3118540 | -0.0435766 | -182.287 |
| -0.77622195 | -0.3604893 | -0.0779975 | -209.730 |
| -0.55497944 | -0.3049239 | -0.0690336 | -210.649 |
| -0.20533026 | -0.1407140 | -0.0115841 | -169.751 |
| 0.21462959 | 0.1078648 | 0.0830481 | -103.830 |
| 0.64098945 | 0.3934790 | 0.1930507 | -38.426 |
| 1.01532655 | 0.6592512 | 0.2947965 | 30.278 |
| 1.28597577 | 0.8485444 | 0.3642426 | 104.684 |
| 1.40875972 | 0.9153914 | 0.3793850 | 154.027 |
| 1.35735143 | 0.8406875 | 0.3315992 | 144.565 |
| 1.13315698 | 0.6412062 | 0.2330596 | 116.081 |
| 0.75890086 | 0.3560172 | 0.1049727 | 80.572 |
| 0.27512367 | 0.0328594 | -0.0309200 | 39.754 |
| -0.26021367 | -0.2805218 | -0.1544751 | -16.742 |
| -0.77286807 | -0.5398615 | -0.2458626 | -85.969 |
| -1.18193360 | -0.7090066 | -0.2888112 | -136.730 |
| -1.41736878 | -0.7668333 | -0.2780200 | -182.465 |
| -1.42864602 | -0.7034744 | -0.2156044 | -223.346 |
| -1.19297753 | -0.5184512 | -0.1080927 | -239.987 |
| -0.72306104 | -0.2234938 | 0.0332893 | -247.395 |
| -0.06411133 | 0.1594291 | 0.1971421 | -227.491 |
| 0.70839330 | 0.5946212 | 0.3694337 | -178.364 |
| 1.49838431 | 1.0341273 | 0.5335132 | -127.547 |
| 2.20780238 | 1.4279793 | 0.6757449 | -81.186 |
| 2.75051739 | 1.7311300 | 0.7853868 | -36.944 |
| 3.06281490 | 1.9088692 | 0.8529136 | -24.600 |
| 3.11616480 | 1.9463871 | 0.8745943 | -34.181 |
| 2.91720389 | 1.8473228 | 0.8496902 | -44.950 |
| 2.49988292 | 1.6264928 | 0.7762285 | -57.409 |
| 1.91921354 | 1.3067619 | 0.6540025 | -73.843 |
| 1.24367866 | 0.9173205 | 0.4889793 | -87.059 |
| 0.54428709 | 0.4905452 | 0.2937112 | -92.791 |
| -0.11526615 | 0.0599416 | 0.0857101 | -92.483 |
| -0.68445048 | -0.3404138 | -0.1145709 | -89.822 |
| -1.12828668 | -0.6773099 | -0.2866232 | -80.010 |
| -1.42845993 | -0.9231497 | -0.4144798 | -62.863 |
| -1.58131934 | -1.0605360 | -0.4892428 | -42.112 |
| -1.59403475 | -1.0851053 | -0.5091856 | -16.997 |
| -1.48362144 | -1.0085320 | -0.4809593 | 35.134 |
| -1.28043020 | -0.8617740 | -0.4225431 | 95.430 |
| -1.02156437 | -0.6843944 | -0.3542995 | 121.988 |
| -0.73950235 | -0.5074553 | -0.2864865 | 130.025 |
| -0.46258148 | -0.3498417 | -0.2217649 | 120.823 |
| -0.21462881 | -0.2179309 | -0.1593626 | 105.168 |
| -0.01410146 | -0.1095198 | -0.0991820 | 83.130 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 0.12890991 | -0.0183589 | -0.0423355 | 60.052 |
| 0.21355147 | 0.0600528 | 0.0086763 | 44.621 |
| 0.24557861 | 0.1233990 | 0.0491040 | 43.998 |
| 0.23293775 | 0.1613080 | 0.0717805 | 55.854 |
| 0.18249794 | 0.1596423 | 0.0693676 | 73.090 |
| 0.09818743 | 0.1072919 | 0.0374065 | 92.637 |
| -0.02015263 | 0.0010248 | -0.0242191 | 110.987 |
| -0.17563578 | -0.1525649 | -0.1107437 | 125.291 |
| -0.37099542 | -0.3382952 | -0.2128650 | 133.984 |
| -0.60448385 | -0.5361953 | -0.3183127 | 138.813 |
| -0.86655669 | -0.7261232 | -0.4143824 | 134.968 |
| -1.13717452 | -0.8899958 | -0.4894262 | 122.783 |
| -1.38735371 | -1.0136829 | -0.5354428 | 112.721 |
| -1.58572083 | -1.0895842 | -0.5515616 | 106.939 |
| -1.70470443 | -1.1161904 | -0.5433646 | 101.328 |
| -1.72479127 | -1.0952680 | -0.5185025 | 93.144 |
| -1.63756796 | -1.0294034 | -0.4823223 | 81.019 |
| -1.44727038 | -0.9209817 | -0.4357949 | 69.372 |
| -1.17110379 | -0.7733691 | -0.3769794 | 61.394 |
| -0.83693636 | -0.5925013 | -0.3038248 | 57.149 |
| -0.47843784 | -0.3877490 | -0.2164504 | 55.232 |
| -0.12915940 | -0.1718637 | -0.1182161 | 51.485 |
| 0.18328447 | 0.0405177 | -0.0150546 | 41.456 |
| 0.44125365 | 0.2352418 | 0.0860917 | 24.389 |
| 0.63802176 | 0.4007335 | 0.1784647 | 0.851 |
| 0.77654014 | 0.5299663 | 0.2566846 | -30.789 |
| 0.86666328 | 0.6215995 | 0.3176289 | -56.719 |
| 0.91918489 | 0.6773015 | 0.3585569 | -76.993 |
| 0.94349560 | 0.7012614 | 0.3784063 | -98.610 |
| 0.94824953 | 0.7011452 | 0.3804850 | -119.720 |
| 0.94130783 | 0.6870936 | 0.3721156 | -142.950 |
| 0.93025440 | 0.6705389 | 0.3628063 | -160.578 |
| 0.92086659 | 0.6607048 | 0.3596993 | -166.372 |
| 0.91606328 | 0.6618267 | 0.3645336 | -167.201 |
| 0.91731126 | 0.6736456 | 0.3749648 | -160.156 |
| 0.92380486 | 0.6909499 | 0.3854432 | -144.027 |
| 0.93113831 | 0.7039682 | 0.3886231 | -119.915 |
| 0.93104110 | 0.7007065 | 0.3777267 | -95.027 |
| 0.91291938 | 0.6709841 | 0.3493212 | -70.301 |
| 0.86551517 | 0.6093122 | 0.3040336 | -53.914 |
| 0.78118373 | 0.5182608 | 0.2475935 | -55.362 |
| 0.66050307 | 0.4099218 | 0.1905330 | -65.982 |
| 0.51230187 | 0.3013855 | 0.1433159 | -79.118 |
| 0.35216495 | 0.2089150 | 0.1121318 | -88.618 |
| 0.20003020 | 0.1433237 | 0.0974252 | -95.881 |
| 0.07769422 | 0.1087166 | 0.0958516 | -100.131 |
| 0.00473971 | 0.1031648 | 0.1026725 | -101.456 |
| -0.00561082 | 0.1213441 | 0.1139832 | -104.558 |
| 0.05128720 | 0.1586169 | 0.1287431 | -109.938 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 0.17028615 | 0.21311115 | 0.1485005 | -113.561 |
| 0.33637661 | 0.2845616 | 0.1750709 | -111.334 |
| 0.52675131 | 0.3713507 | 0.2083218 | -102.188 |
| 0.71473595 | 0.4676077 | 0.2453022 | -84.228 |
| 0.87313455 | 0.5607099 | 0.2796380 | -51.037 |
| 0.97555645 | 0.6299961 | 0.3008106 | -5.166 |
| 0.99827669 | 0.6499556 | 0.2961225 | 47.227 |
| 0.92191492 | 0.5961420 | 0.2539241 | 104.188 |
| 0.73144599 | 0.4500993 | 0.1654926 | 166.911 |
| 0.41617903 | 0.2026010 | 0.0262091 | 225.755 |
| -0.02517721 | -0.1411228 | -0.1599270 | 247.804 |
| -0.57397742 | -0.5539138 | -0.3733936 | 232.200 |
| -1.18963615 | -0.9899991 | -0.5835315 | 201.922 |
| -1.81605782 | -1.3972542 | -0.7609810 | 164.814 |
| -2.38733925 | -1.7271023 | -0.8851166 | 123.156 |
| -2.83453974 | -1.9417674 | -0.9461873 | 90.802 |
| -3.09744152 | -2.0215700 | -0.9463866 | 76.986 |
| -3.13686094 | -1.9681485 | -0.8978280 | 85.476 |
| -2.94526453 | -1.8035064 | -0.8189702 | 131.485 |
| -2.55430338 | -1.5669572 | -0.7319806 | 190.393 |
| -2.02704490 | -1.3014509 | -0.6526173 | 230.580 |
| -1.44224343 | -1.0393477 | -0.5825481 | 255.511 |
| -0.88193271 | -0.7996276 | -0.5141863 | 261.878 |
| -0.41670877 | -0.5889430 | -0.4374486 | 244.906 |
| -0.09168472 | -0.4050837 | -0.3450170 | 211.618 |
| 0.08047505 | -0.2436352 | -0.2368768 | 165.654 |
| 0.11892952 | -0.1035089 | -0.1214448 | 125.185 |
| 0.06455617 | 0.0088932 | -0.0151200 | 87.280 |
| -0.03043266 | 0.0844565 | 0.0653518 | 38.859 |
| -0.11258671 | 0.1205904 | 0.1120280 | -9.391 |
| -0.14127493 | 0.1239517 | 0.1263978 | -44.769 |
| -0.09886753 | 0.1087124 | 0.1161326 | -68.133 |
| 0.00860937 | 0.0935534 | 0.0929709 | -74.520 |
| 0.15603916 | 0.0948254 | 0.0689654 | -62.807 |
| 0.30790855 | 0.1198076 | 0.0530948 | -38.340 |
| 0.42907317 | 0.1639991 | 0.0497608 | -10.007 |
| 0.49483109 | 0.2140972 | 0.0593787 | 2.129 |
| 0.49980002 | 0.2573897 | 0.0820592 | -18.027 |
| 0.46094655 | 0.2908881 | 0.1199077 | -62.246 |
| 0.41049507 | 0.3221402 | 0.1735796 | -109.712 |
| 0.38563275 | 0.3652389 | 0.2396386 | -179.476 |
| 0.42652020 | 0.4420597 | 0.3179823 | -263.877 |
| 0.56775475 | 0.5744348 | 0.4116728 | -307.637 |
| 0.82184394 | 0.7675005 | 0.5168945 | -330.376 |
| 1.17996814 | 1.0110253 | 0.6276210 | -338.111 |
| 1.61350140 | 1.2825500 | 0.7374619 | -304.356 |
| 2.07087013 | 1.5459392 | 0.8337108 | -247.357 |
| 2.48596501 | 1.7599686 | 0.9007369 | -182.093 |
| 2.78862109 | 1.8863120 | 0.9237979 | -95.657 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 2.91206963 | 1.8918694 | 0.8890639 | -27.238 |
| 2.80876367 | 1.7580752 | 0.7916327 | 36.631 |
| 2.45549771 | 1.4799427 | 0.6333597 | 90.209 |
| 1.85834811 | 1.0670029 | 0.4224315 | 114.822 |
| 1.05658567 | 0.5461359 | 0.1747967 | 126.870 |
| 0.11655295 | -0.0428000 | -0.0906944 | 114.297 |
| -0.87330569 | -0.6480997 | -0.3521657 | 81.463 |
| -1.81304777 | -1.2118558 | -0.5871042 | 49.478 |
| -2.60710278 | -1.6805323 | -0.7777614 | 22.864 |
| -3.17636284 | -2.0118674 | -0.9119337 | 4.785 |
| -3.46704999 | -2.1789332 | -0.9818385 | -4.831 |
| -3.45648339 | -2.1719221 | -0.9834017 | 0.322 |
| -3.15678258 | -1.9994673 | -0.9181150 | 24.002 |
| -2.61340716 | -1.6872480 | -0.7942259 | 52.256 |
| -1.89605935 | -1.2718653 | -0.6241188 | 81.858 |
| -1.08831688 | -0.7960485 | -0.4231054 | 104.950 |
| -0.27588111 | -0.3039569 | -0.2079129 | 120.366 |
| 0.46341816 | 0.1619169 | 0.0038704 | 127.722 |
| 1.06718436 | 0.5632127 | 0.1944381 | 128.468 |
| 1.49295732 | 0.8680373 | 0.3469592 | 122.173 |
| 1.71995000 | 1.0537130 | 0.4477048 | 110.713 |
| 1.74715431 | 1.1083912 | 0.4874845 | 103.156 |
| 1.58757847 | 1.0299728 | 0.4610796 | 108.225 |
| 1.26211170 | 0.8243919 | 0.3669798 | 122.423 |
| 0.79703849 | 0.5062031 | 0.2098949 | 137.943 |
| 0.22421599 | 0.0999460 | 0.0033964 | 146.439 |
| -0.41732837 | -0.3590328 | -0.2295066 | 137.443 |
| -1.07932732 | -0.8249951 | -0.4584263 | 111.714 |
| -1.70557450 | -1.2467167 | -0.6521213 | 79.132 |
| -2.23642911 | -1.5756505 | -0.7862779 | 40.469 |
| -2.61319754 | -1.7725067 | -0.8468446 | 2.037 |
| -2.78507344 | -1.8134005 | -0.8309694 | -28.640 |
| -2.71694347 | -1.6930908 | -0.7451582 | -59.784 |
| -2.39470420 | -1.4226256 | -0.6002485 | -76.958 |
| -1.83259116 | -1.0281228 | -0.4107171 | -86.451 |
| -1.07330184 | -0.5445594 | -0.1914891 | -93.872 |
| -0.18315806 | -0.0095195 | 0.0442350 | -96.773 |
| 0.75518384 | 0.5394791 | 0.2840872 | -97.935 |
| 1.65370381 | 1.0663929 | 0.5158175 | -96.711 |
| 2.43031263 | 1.5364069 | 0.7262694 | -92.107 |
| 3.01838139 | 1.9156537 | 0.9008408 | -83.749 |
| 3.37317326 | 2.1725685 | 1.0241914 | -73.622 |
| 3.47464218 | 2.2815068 | 1.0823839 | -63.200 |
| 3.32667475 | 2.2276814 | 1.0658022 | -59.274 |
| 2.95461129 | 2.0125991 | 0.9727768 | -62.115 |
| 2.40016935 | 1.6559917 | 0.8108433 | -68.901 |
| 1.71558586 | 1.1937279 | 0.5958130 | -77.963 |
| 0.95909521 | 0.6731343 | 0.3499994 | -89.529 |
| 0.19186531 | 0.1468608 | 0.0997775 | -101.454 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| -0.52518575 | -0.3342271 | -0.1282592 | -110.894 |
| -1.13511168 | -0.7274404 | -0.3115997 | -116.409 |
| -1.58927996 | -1.0027058 | -0.4353181 | -113.178 |
| -1.85290749 | -1.1454710 | -0.4945570 | -99.925 |
| -1.90954436 | -1.1566944 | -0.4939934 | -80.555 |
| -1.76377649 | -1.0506350 | -0.4449446 | -47.471 |
| -1.44362393 | -0.8534184 | -0.3634023 | -9.409 |
| -0.99684725 | -0.5977487 | -0.2650978 | 26.281 |
| -0.48423322 | -0.3174456 | -0.1619938 | 59.386 |
| 0.02747279 | -0.0444608 | -0.0626870 | 90.028 |
| 0.47386144 | 0.1931906 | 0.0259255 | 111.889 |
| 0.80286763 | 0.3743932 | 0.0986102 | 117.240 |
| 0.98328493 | 0.4872699 | 0.1523424 | 109.018 |
| 1.00747523 | 0.5281792 | 0.1848623 | 94.286 |
| 0.88909512 | 0.4992200 | 0.1931353 | 76.840 |
| 0.65832742 | 0.4068683 | 0.1740223 | 57.933 |
| 0.35528555 | 0.2615639 | 0.1262432 | 43.839 |
| 0.02150900 | 0.0765041 | 0.0512290 | 37.402 |
| -0.30682925 | -0.1327397 | -0.0458832 | 33.119 |
| -0.60176975 | -0.3473172 | -0.1548409 | 30.551 |
| -0.84477304 | -0.5461853 | -0.2615950 | 30.239 |
| -1.02597720 | -0.7087367 | -0.3513755 | 30.439 |
| -1.14151661 | -0.8177150 | -0.4117461 | 32.268 |
| -1.19111088 | -0.8626255 | -0.4356106 | 37.633 |
| -1.17648261 | -0.8421338 | -0.4228104 | 43.327 |
| -1.10011949 | -0.7635826 | -0.3789805 | 48.409 |
| -0.96580128 | -0.6408803 | -0.3134659 | 51.380 |
| -0.77986592 | -0.4908706 | -0.2365762 | 48.149 |
| -0.55204102 | -0.3290126 | -0.1567372 | 40.670 |
| -0.29635873 | -0.1669564 | -0.0794818 | 27.400 |
| -0.02971458 | -0.0108868 | -0.0066012 | 4.649 |
| 0.23125379 | 0.1386264 | 0.0638911 | -20.440 |
| 0.47173823 | 0.2832046 | 0.1348113 | -44.746 |
| 0.68059560 | 0.4233764 | 0.2073650 | -65.670 |
| 0.85156585 | 0.5564578 | 0.2798545 | -82.176 |
| 0.98332050 | 0.6762191 | 0.3477606 | -94.722 |
| 1.07832500 | 0.7743445 | 0.4050045 | -103.854 |
| 1.14079722 | 0.8428636 | 0.4457049 | -110.967 |
| 1.17480494 | 0.8768444 | 0.4660844 | -118.248 |
| 1.18310346 | 0.8762447 | 0.4658006 | -123.605 |
| 1.16633074 | 0.8455374 | 0.4475961 | -126.996 |
| 1.12388352 | 0.7924701 | 0.4166077 | -130.073 |
| 1.05590065 | 0.7263651 | 0.3793863 | -130.157 |
| 0.96422877 | 0.6553096 | 0.3416342 | -124.179 |
| 0.85255959 | 0.5838098 | 0.3061460 | -112.837 |
| 0.72660854 | 0.5125957 | 0.2726609 | -99.937 |
| 0.59445089 | 0.4406910 | 0.2396667 | -92.992 |
| 0.46672329 | 0.3686615 | 0.2069688 | -91.203 |
| 0.35455922 | 0.2996538 | 0.1759124 | -91.000 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 0.26683642 | 0.2386164 | 0.1483025 | -90.127 |
| 0.20855182 | 0.1909243 | 0.1256848 | -87.608 |
| 0.18051159 | 0.1608044 | 0.1091741 | -82.527 |
| 0.17984946 | 0.1499034 | 0.0994194 | -75.811 |
| 0.20120530 | 0.1567946 | 0.0966986 | -67.716 |
| 0.23760672 | 0.1770856 | 0.1004855 | -56.524 |
| 0.28083345 | 0.2039624 | 0.1087044 | -45.051 |
| 0.32276349 | 0.2302603 | 0.1184268 | -38.148 |
| 0.35691451 | 0.2506951 | 0.1271424 | -32.581 |
| 0.37808427 | 0.2617360 | 0.1324084 | -26.469 |
| 0.38198276 | 0.2609381 | 0.1317360 | -19.510 |
| 0.36541567 | 0.2465593 | 0.1231591 | -12.040 |
| 0.32656111 | 0.2174052 | 0.1058017 | -3.233 |
| 0.26474941 | 0.1725758 | 0.0797166 | 8.658 |
| 0.17996366 | 0.1113234 | 0.0452692 | 22.394 |
| 0.07295880 | 0.0336686 | 0.0030817 | 37.119 |
| -0.05453329 | -0.0590695 | -0.0459202 | 52.071 |
| -0.19963090 | -0.1641378 | -0.1004478 | 66.897 |
| -0.35825037 | -0.2776661 | -0.1588499 | 81.745 |
| -0.52518806 | -0.3952310 | -0.2191733 | 95.679 |
| -0.69403931 | -0.5120970 | -0.2790081 | 107.111 |
| -0.85704619 | -0.6230560 | -0.3352682 | 114.229 |
| -1.00494231 | -0.7219608 | -0.3840452 | 114.020 |
| -1.12699274 | -0.8013513 | -0.4207427 | 109.711 |
| -1.21261384 | -0.8537919 | -0.4416491 | 104.270 |
| -1.25299467 | -0.8734310 | -0.4450486 | 96.171 |
| -1.24167822 | -0.8566074 | -0.4307842 | 87.301 |
| -1.17566388 | -0.8028067 | -0.4000725 | 79.342 |
| -1.05681703 | -0.7155628 | -0.3556529 | 78.110 |
| -0.89370255 | -0.6034497 | -0.3025516 | 83.648 |
| -0.70143863 | -0.4790156 | -0.2472761 | 91.849 |
| -0.49974353 | -0.3562290 | -0.1960177 | 102.670 |
| -0.31091396 | -0.2485647 | -0.1538873 | 112.961 |
| -0.15669462 | -0.1669033 | -0.1241296 | 119.961 |
| -0.05478781 | -0.1179208 | -0.1077287 | 121.564 |
| -0.01567063 | -0.1032536 | -0.1034793 | 115.289 |
| -0.04011690 | -0.1192413 | -0.1082176 | 100.569 |
| -0.11833869 | -0.1575420 | -0.1174677 | 77.844 |
| -0.23120277 | -0.2066154 | -0.1264676 | 53.094 |
| -0.35409118 | -0.2544790 | -0.1318781 | 29.741 |
| -0.46124461 | -0.2907271 | -0.1322232 | 8.699 |
| -0.52963877 | -0.3073165 | -0.1269690 | -9.841 |
| -0.54225320 | -0.2986597 | -0.1153732 | -25.547 |
| -0.49061476 | -0.2617027 | -0.0961381 | -35.006 |
| -0.37607930 | -0.1961421 | -0.0679316 | -45.316 |
| -0.20759972 | -0.1028831 | -0.0286555 | -54.665 |
| 0.00026213 | 0.0156454 | 0.0232842 | -63.225 |
| 0.22989400 | 0.1547856 | 0.0875831 | -69.357 |
| 0.46308532 | 0.3068778 | 0.1610726 | -74.241 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 0.68345732 | 0.4615286 | 0.2381293 | -78.316 |
| 0.87800949 | 0.6067196 | 0.3118449 | -83.957 |
| 1.03797181 | 0.7309570 | 0.3757847 | -91.722 |
| 1.15843493 | 0.8252745 | 0.4251321 | -100.090 |
| 1.23716813 | 0.8844436 | 0.4569926 | -108.853 |
| 1.27389081 | 0.9076773 | 0.4706500 | -117.872 |
| 1.27008253 | 0.8984219 | 0.4676009 | -126.211 |
| 1.22917778 | 0.8632492 | 0.4512125 | -135.145 |
| 1.15728243 | 0.8106676 | 0.4263684 | -143.352 |
| 1.06310983 | 0.7493948 | 0.3982614 | -149.188 |
| 0.95722311 | 0.6868326 | 0.3710133 | -152.240 |
| 0.85094345 | 0.6283499 | 0.3469277 | -152.003 |
| 0.75495451 | 0.5772280 | 0.3264765 | -150.378 |
| 0.67782993 | 0.5350219 | 0.3088974 | -141.906 |
| 0.62305410 | 0.5003533 | 0.2915250 | -122.663 |
| 0.58750039 | 0.4686612 | 0.2703072 | -103.580 |
| 0.56427026 | 0.4355598 | 0.2434945 | -88.924 |
| 0.54520418 | 0.3989816 | 0.2130263 | -77.591 |
| 0.52242530 | 0.3594103 | 0.1830976 | -71.506 |
| 0.49055742 | 0.3199534 | 0.1585257 | -70.381 |
| 0.44827779 | 0.2853345 | 0.1429175 | -71.411 |
| 0.39838429 | 0.2597371 | 0.1370481 | -71.264 |
| 0.34630435 | 0.2443269 | 0.1380870 | -63.295 |
| 0.29690559 | 0.2349851 | 0.1394984 | -46.017 |
| 0.25180659 | 0.2225105 | 0.1329059 | -20.710 |
| 0.20782012 | 0.1951647 | 0.1109509 | 7.848 |
| 0.15663843 | 0.1422310 | 0.0695824 | 42.875 |
| 0.08468653 | 0.0559130 | 0.0077957 | 77.540 |
| -0.02291251 | -0.0655510 | -0.0713529 | 100.289 |
| -0.17604166 | -0.2153720 | -0.1597588 | 113.110 |
| -0.37615311 | -0.3803956 | -0.2471013 | 118.271 |
| -0.61479213 | -0.5452215 | -0.3244800 | 122.152 |
| -0.87436263 | -0.6965112 | -0.3871604 | 121.328 |
| -1.12916497 | -0.8240785 | -0.4337079 | 115.666 |
| -1.34925440 | -0.9210679 | -0.4646988 | 110.610 |
| -1.50700553 | -0.9842261 | -0.4823399 | 107.061 |
| -1.58272765 | -1.0126948 | -0.4891738 | 105.113 |
| -1.56821834 | -1.0064642 | -0.4866081 | 103.126 |
| -1.46754599 | -0.9653693 | -0.4739340 | 101.170 |
| -1.29554634 | -0.8895144 | -0.4487272 | 98.972 |
| -1.07427722 | -0.7805159 | -0.4081739 | 96.477 |
| -0.82851016 | -0.6429275 | -0.3508454 | 93.843 |
| -0.58152636 | -0.4851823 | -0.2782968 | 91.279 |
| -0.35213210 | -0.3194735 | -0.1957883 | 88.101 |
| -0.15314764 | -0.1602165 | -0.1115695 | 82.659 |
| 0.00870506 | -0.0213946 | -0.0348821 | 73.651 |
| 0.13175041 | 0.0862939 | 0.0264652 | 60.132 |
| 0.21768151 | 0.1575418 | 0.0680216 | 44.450 |
| 0.26937746 | 0.1926325 | 0.0890299 | 30.229 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 0.28961325 | 0.1964693 | 0.0919580 | 13.170 |
| 0.28236381 | 0.1782731 | 0.0827964 | -5.866 |
| 0.25363663 | 0.1496535 | 0.0695169 | -23.393 |
| 0.21139204 | 0.1216910 | 0.0593347 | -38.112 |
| 0.16543066 | 0.1029219 | 0.0568830 | -50.752 |
| 0.12700490 | 0.0986254 | 0.0638229 | -61.478 |
| 0.10729804 | 0.1106645 | 0.0791130 | -67.564 |
| 0.11468447 | 0.1373530 | 0.0993652 | -68.754 |
| 0.15270664 | 0.1744643 | 0.1202833 | -68.683 |
| 0.21965119 | 0.2173115 | 0.1388429 | -67.945 |
| 0.30859090 | 0.2619584 | 0.1541043 | -66.202 |
| 0.40833072 | 0.3055764 | 0.1668219 | -64.597 |
| 0.50560649 | 0.3464222 | 0.1786459 | -62.274 |
| 0.58733316 | 0.3828989 | 0.1907045 | -57.535 |
| 0.64260377 | 0.4124231 | 0.2024408 | -52.383 |
| 0.66485087 | 0.4315407 | 0.2119581 | -48.934 |
| 0.65290193 | 0.4366656 | 0.2168678 | -45.723 |
| 0.61012042 | 0.4246375 | 0.2146550 | -43.811 |
| 0.54304003 | 0.3938798 | 0.2034597 | -42.065 |
| 0.45921419 | 0.3449032 | 0.1823407 | -37.579 |
| 0.36493339 | 0.2798969 | 0.1510883 | -30.332 |
| 0.26410243 | 0.2022066 | 0.1104211 | -18.245 |
| 0.15779372 | 0.1152672 | 0.0618321 | -3.606 |
| 0.04532881 | 0.0223122 | 0.0078899 | 12.496 |
| -0.07460562 | -0.0740335 | -0.0482576 | 32.386 |
| -0.20357842 | -0.1725736 | -0.1043401 | 54.361 |
| -0.34227778 | -0.2730429 | -0.1592478 | 73.987 |
| -0.48885714 | -0.3745291 | -0.2120921 | 87.777 |
| -0.63799697 | -0.4742046 | -0.2613463 | 95.510 |
| -0.78129051 | -0.5672012 | -0.3048362 | 97.681 |
| -0.90847347 | -0.6473401 | -0.3402042 | 98.031 |
| -1.00939663 | -0.7086901 | -0.3657710 | 96.346 |
| -1.07521960 | -0.7463848 | -0.3804103 | 93.304 |
| -1.09955271 | -0.7573306 | -0.3834318 | 90.650 |
| -1.07975900 | -0.7409844 | -0.3749199 | 90.505 |
| -1.01804865 | -0.6999149 | -0.3562493 | 94.205 |
| -0.92168723 | -0.6396350 | -0.3301218 | 98.924 |
| -0.80167298 | -0.5672284 | -0.2995829 | 103.292 |
| -0.67105676 | -0.4900527 | -0.2673037 | 105.586 |
| -0.54311351 | -0.4147269 | -0.2352826 | 106.808 |
| -0.43002984 | -0.3469454 | -0.2053106 | 107.319 |
| -0.34159809 | -0.2913606 | -0.1792379 | 105.838 |
| -0.28386804 | -0.2511749 | -0.1586536 | 102.270 |
| -0.25852026 | -0.2279312 | -0.1446028 | 96.207 |
| -0.26296663 | -0.2213947 | -0.1373791 | 89.295 |
| -0.29135169 | -0.2297891 | -0.1366815 | 81.048 |
| -0.33550708 | -0.2497023 | -0.1414132 | 71.621 |
| -0.38604113 | -0.2761770 | -0.1495923 | 61.049 |
| -0.43330036 | -0.3029980 | -0.1583835 | 48.628 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| -0.46826314 | -0.3233740 | -0.1644543 | 39.086 |
| -0.48427250 | -0.3318669 | -0.1654356 | 32.944 |
| -0.47746529 | -0.3252083 | -0.1601592 | 25.969 |
| -0.44582481 | -0.3016677 | -0.1476476 | 18.530 |
| -0.38904868 | -0.2610004 | -0.1271501 | 10.845 |
| -0.30857795 | -0.2043445 | -0.0985188 | 2.693 |
| -0.20745086 | -0.1338954 | -0.0624402 | -5.442 |
| -0.09018678 | -0.0527370 | -0.0205802 | -13.184 |
| 0.03746902 | 0.0352740 | 0.0245909 | -20.729 |
| 0.16902776 | 0.1257333 | 0.0703149 | -28.047 |
| 0.29773330 | 0.2139355 | 0.1140275 | -34.871 |
| 0.41687101 | 0.2950893 | 0.1535328 | -39.724 |
| 0.51972947 | 0.3643211 | 0.1867070 | -41.290 |
| 0.59974846 | 0.4169103 | 0.2113641 | -41.851 |
| 0.65152926 | 0.4493138 | 0.2259595 | -42.355 |
| 0.67163731 | 0.4598316 | 0.2300007 | -42.783 |
| 0.65900195 | 0.4487082 | 0.2239771 | -43.183 |
| 0.61509488 | 0.4179233 | 0.2091047 | -42.867 |
| 0.54369186 | 0.3706071 | 0.1868678 | -40.751 |
| 0.45032186 | 0.3103395 | 0.1586197 | -37.247 |
| 0.34182780 | 0.2408688 | 0.1256831 | -32.966 |
| 0.22570954 | 0.1659401 | 0.0894882 | -26.302 |
| 0.10898714 | 0.0888602 | 0.0513201 | -18.622 |
| -0.00227739 | 0.0127338 | 0.0126109 | -10.831 |
| -0.10328212 | -0.0593358 | -0.0249092 | -2.543 |
| -0.19081200 | -0.1244456 | -0.0594839 | 5.615 |
| -0.26310553 | -0.1800385 | -0.0894916 | 13.233 |
| -0.31944790 | -0.2240636 | -0.1135600 | 19.225 |
| -0.35960112 | -0.2550494 | -0.1305926 | 23.945 |
| -0.38357383 | -0.2723678 | -0.1400360 | 27.262 |
| -0.39140264 | -0.2762086 | -0.1419165 | 27.768 |
| -0.38295513 | -0.2672464 | -0.1366190 | 27.554 |
| -0.35862786 | -0.2469602 | -0.1252732 | 27.679 |
| -0.31995292 | -0.2177609 | -0.1097963 | 27.982 |
| -0.26974225 | -0.1826970 | -0.0923906 | 28.245 |
| -0.21198880 | -0.1450565 | -0.0749829 | 28.322 |
| -0.15152637 | -0.1079399 | -0.0588417 | 27.288 |
| -0.09320637 | -0.0736044 | -0.0442470 | 23.115 |
| -0.04079999 | -0.0428107 | -0.0303769 | 17.125 |
| 0.00343305 | -0.0150734 | -0.0160663 | 9.091 |
| 0.03927504 | 0.0110913 | -0.0002686 | -1.433 |
| 0.06871456 | 0.0376854 | 0.0176508 | -10.918 |
| 0.09494657 | 0.0659889 | 0.0372207 | -19.561 |
| 0.12175017 | 0.0962898 | 0.0572746 | -28.176 |
| 0.15304368 | 0.1283762 | 0.0768888 | -38.455 |
| 0.19251125 | 0.1624130 | 0.0962000 | -50.277 |
| 0.24270814 | 0.1991493 | 0.1161423 | -59.311 |
| 0.30357865 | 0.2389438 | 0.1370747 | -64.993 |
| 0.37242312 | 0.2814566 | 0.1585368 | -70.610 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 0.44524066 | 0.3260990 | 0.1801174 | -75.335 |
| 0.51743934 | 0.3716511 | 0.2014575 | -78.671 |
| 0.58441216 | 0.4159834 | 0.2220331 | -81.369 |
| 0.64218625 | 0.4563537 | 0.2411221 | -82.925 |
| 0.68763297 | 0.4897705 | 0.2576188 | -83.889 |
| 0.71870339 | 0.5136825 | 0.2702358 | -85.617 |
| 0.73478260 | 0.5268176 | 0.2780908 | -89.082 |
| 0.73683107 | 0.5296209 | 0.2811480 | -93.486 |
| 0.72705956 | 0.5239558 | 0.2801187 | -98.252 |
| 0.70856009 | 0.5125476 | 0.2762101 | -102.716 |
| 0.68483671 | 0.4982607 | 0.2707261 | -104.992 |
| 0.65908845 | 0.4832316 | 0.2644937 | -105.201 |
| 0.63382193 | 0.4685491 | 0.2577666 | -102.707 |
| 0.61051217 | 0.4542173 | 0.2502962 | -99.361 |
| 0.58978291 | 0.4397763 | 0.2418849 | -95.446 |
| 0.57118949 | 0.4244863 | 0.2323585 | -87.477 |
| 0.55223828 | 0.4065422 | 0.2206493 | -74.249 |
| 0.52823979 | 0.3828519 | 0.2046984 | -58.444 |
| 0.49346178 | 0.3499138 | 0.1825584 | -41.739 |
| 0.44232379 | 0.3046647 | 0.1532267 | -24.874 |
| 0.37033784 | 0.2450870 | 0.1168203 | -8.947 |
| 0.27508976 | 0.1708576 | 0.0744997 | 4.238 |
| 0.15748794 | 0.0842056 | 0.0285783 | 10.103 |
| 0.02302354 | -0.0093157 | -0.0172360 | 12.269 |
| -0.11925624 | -0.1023699 | -0.0593965 | 13.994 |
| -0.25830415 | -0.1877210 | -0.0956952 | 13.790 |
| -0.38198044 | -0.2589917 | -0.1248277 | 13.153 |
| -0.47877942 | -0.3115673 | -0.1461444 | 13.267 |
| -0.53989938 | -0.3432303 | -0.1596037 | 16.588 |
| -0.56137688 | -0.3546117 | -0.1660845 | 24.537 |
| -0.54532830 | -0.3490394 | -0.1674371 | 35.896 |
| -0.49950123 | -0.3314741 | -0.1657697 | 47.230 |
| -0.43548963 | -0.3071374 | -0.1625369 | 59.140 |
| -0.36702617 | -0.2811684 | -0.1587379 | 70.107 |
| -0.30766377 | -0.2582498 | -0.1550955 | 79.653 |
| -0.26861771 | -0.2424328 | -0.1523720 | 87.080 |
| -0.25712636 | -0.2369767 | -0.1515774 | 92.597 |
| -0.27574947 | -0.2442490 | -0.1540667 | 96.137 |
| -0.32218727 | -0.2651659 | -0.1610201 | 93.285 |
| -0.38906998 | -0.2978277 | -0.1720996 | 85.997 |
| -0.46569713 | -0.3377648 | -0.1856994 | 77.698 |
| -0.54033097 | -0.3788948 | -0.1996821 | 66.153 |
| -0.60089245 | -0.4134009 | -0.2107705 | 48.437 |
| -0.63558234 | -0.4321771 | -0.2144362 | 33.426 |
| -0.63590310 | -0.4281845 | -0.2075942 | 25.052 |
| -0.59844459 | -0.3987508 | -0.1900199 | 21.200 |
| -0.52473763 | -0.3457149 | -0.1636364 | 22.733 |
| -0.42103478 | -0.2750204 | -0.1317422 | 25.741 |
| -0.29704281 | -0.1948343 | -0.0976057 | 29.421 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| -0.16484211 | -0.1138083 | -0.0639572 | 32.636 |
| -0.03737307 | -0.0393855 | -0.0327819 | 31.918 |
| 0.07396833 | 0.0239362 | -0.0047840 | 25.630 |
| 0.16137311 | 0.0751370 | 0.0205627 | 15.323 |
| 0.22162766 | 0.1157674 | 0.0442327 | 1.344 |
| 0.25676148 | 0.1489723 | 0.0673105 | -16.877 |
| 0.27383867 | 0.1786189 | 0.0908755 | -34.515 |
| 0.28266264 | 0.2076347 | 0.1149823 | -49.274 |
| 0.29327314 | 0.2373070 | 0.1384592 | -61.344 |
| 0.31408491 | 0.2678497 | 0.1598101 | -72.351 |
| 0.35047080 | 0.2992725 | 0.1782039 | -79.024 |
| 0.40291266 | 0.3309587 | 0.1930603 | -79.425 |
| 0.46660662 | 0.3614301 | 0.2038657 | -78.919 |
| 0.53360216 | 0.3894057 | 0.2112095 | -76.846 |
| 0.59456115 | 0.4136436 | 0.2163519 | -74.014 |
| 0.64055826 | 0.4325924 | 0.2203654 | -68.675 |
| 0.66413387 | 0.4436736 | 0.2229171 | -59.921 |
| 0.66006131 | 0.4431217 | 0.2218735 | -50.347 |
| 0.62628961 | 0.4270504 | 0.2143790 | -41.540 |
| 0.56424256 | 0.3928122 | 0.1982373 | -36.309 |
| 0.47881299 | 0.3405580 | 0.1732720 | -35.759 |
| 0.37767002 | 0.2740031 | 0.1416803 | -38.017 |
| 0.26987918 | 0.1998355 | 0.1071471 | -41.794 |
| 0.16482046 | 0.1264985 | 0.0738189 | -46.101 |
| 0.07144031 | 0.0625677 | 0.0454547 | -49.060 |
| -0.00261561 | 0.0148052 | 0.0246022 | -48.749 |
| -0.05188618 | -0.0133712 | 0.0121075 | -45.479 |
| -0.07355279 | -0.0221508 | 0.0073900 | -39.989 |
| -0.06788720 | -0.0147576 | 0.0088493 | -31.081 |
| -0.03883600 | 0.0033703 | 0.0139969 | -21.321 |
| 0.00643370 | 0.0261740 | 0.0202084 | -10.294 |
| 0.05809103 | 0.0478565 | 0.0249770 | 1.149 |
| 0.10515310 | 0.0637088 | 0.0264654 | 8.539 |
| 0.13823267 | 0.0713679 | 0.0246374 | 10.294 |
| 0.15152341 | 0.0709918 | 0.0211757 | 9.178 |
| 0.14321450 | 0.0640903 | 0.0179670 | 6.716 |
| 0.11541232 | 0.0525371 | 0.0159593 | 3.293 |
| 0.07376200 | 0.0382074 | 0.0150143 | -1.961 |
| 0.02641809 | 0.0228963 | 0.0143440 | -4.887 |
| -0.01861182 | 0.0073063 | 0.0121991 | -2.848 |
| -0.05585139 | -0.0094068 | 0.0061585 | 2.253 |
| -0.08321821 | -0.0287754 | -0.0055083 | 9.789 |
| -0.10239730 | -0.0523448 | -0.0231602 | 20.777 |
| -0.11878293 | -0.0815667 | -0.0461357 | 34.247 |
| -0.14001619 | -0.1173571 | -0.0729949 | 46.062 |
| -0.17314999 | -0.1591161 | -0.1012602 | 53.620 |
| -0.22208819 | -0.2043658 | -0.1277001 | 56.659 |
| -0.28624199 | -0.2493479 | -0.1493324 | 56.659 |
| -0.36062374 | -0.2902448 | -0.1646029 | 56.178 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| -0.43711120 | -0.3243912 | -0.1740113 | 55.391 |
| -0.50600356 | -0.3505285 | -0.1794446 | 54.405 |
| -0.55790842 | -0.3684399 | -0.1829774 | 52.884 |
| -0.58556869 | -0.3782068 | -0.1857587 | 50.864 |
| -0.58535951 | -0.3796242 | -0.1875941 | 49.806 |
| -0.55826977 | -0.3722881 | -0.1874663 | 50.764 |
| -0.50965230 | -0.3559487 | -0.1842054 | 51.779 |
| -0.44741940 | -0.3305752 | -0.1766125 | 52.398 |
| -0.38005150 | -0.2968201 | -0.1638472 | 52.388 |
| -0.31490144 | -0.2565121 | -0.1459126 | 51.942 |
| -0.25712957 | -0.2128151 | -0.1239885 | 50.746 |
| -0.20918022 | -0.1696675 | -0.1002137 | 46.882 |
| -0.17063298 | -0.1305095 | -0.0768388 | 40.221 |
| -0.13911193 | -0.0975155 | -0.0557899 | 34.083 |
| -0.11204320 | -0.0717675 | -0.0388310 | 27.525 |
| -0.08724713 | -0.0528562 | -0.0267712 | 18.899 |
| -0.06282660 | -0.0385738 | -0.0186638 | 8.996 |
| -0.03731567 | -0.0255850 | -0.0121762 | -0.166 |
| -0.00998433 | -0.0106897 | -0.0047950 | -6.906 |
| 0.01923687 | 0.0082204 | 0.0051714 | -13.518 |
| 0.05067164 | 0.0323143 | 0.0186747 | -20.420 |
| 0.08521856 | 0.0618691 | 0.0358868 | -26.559 |
| 0.12381495 | 0.0959970 | 0.0558887 | -30.195 |
| 0.16658381 | 0.1324740 | 0.0766063 | -32.345 |
| 0.21255113 | 0.1683379 | 0.0956152 | -33.346 |
| 0.25946503 | 0.2005214 | 0.1109110 | -33.378 |
| 0.30394273 | 0.2264958 | 0.1214687 | -34.818 |
| 0.34240248 | 0.2451949 | 0.1277913 | -38.017 |
| 0.37179506 | 0.2571690 | 0.1315186 | -41.411 |
| 0.38996691 | 0.2639076 | 0.1343426 | -44.861 |
| 0.39623092 | 0.2672099 | 0.1373571 | -48.298 |
| 0.39168461 | 0.2685625 | 0.1408058 | -50.526 |
| 0.37885458 | 0.2684935 | 0.1439931 | -51.544 |
| 0.36118234 | 0.2665953 | 0.1457556 | -52.545 |
| 0.34243556 | 0.2621599 | 0.1452004 | -52.746 |
| 0.32564867 | 0.2545932 | 0.1418772 | -52.004 |
| 0.31239095 | 0.2438490 | 0.1358510 | -51.050 |
| 0.30263183 | 0.2307109 | 0.1277549 | -48.818 |
| 0.29468261 | 0.2162739 | 0.1183331 | -44.185 |
| 0.28534652 | 0.2009892 | 0.1078399 | -35.434 |
| 0.27017105 | 0.1836621 | 0.0955280 | -22.553 |
| 0.24425286 | 0.1613799 | 0.0799088 | -9.153 |
| 0.20367449 | 0.1307618 | 0.0598376 | 3.690 |
| 0.14622889 | 0.0891334 | 0.0349508 | 14.586 |
| 0.07171969 | 0.0355421 | 0.0056852 | 24.179 |
| -0.01836022 | -0.0290492 | -0.0272352 | 33.651 |
| -0.12122137 | -0.1021233 | -0.0631554 | 41.444 |
| -0.23249188 | -0.1797310 | -0.1009551 | 46.408 |
| -0.34615121 | -0.2569608 | -0.1386720 | 50.770 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| -0.45539562 | -0.3291046 | -0.1740639 | 54.633 |
| -0.55333371 | -0.3922065 | -0.2049820 | 57.888 |
| -0.63366855 | -0.4431902 | -0.2296704 | 61.136 |
| -0.69145919 | -0.4798974 | -0.2470701 | 63.302 |
| -0.72338055 | -0.5007506 | -0.2566112 | 63.610 |
| -0.72786056 | -0.5046298 | -0.2580044 | 63.444 |
| -0.70552567 | -0.4914295 | -0.2515275 | 64.125 |
| -0.65951637 | -0.4627322 | -0.2383328 | 66.997 |
| -0.59543333 | -0.4221416 | -0.2204770 | 70.579 |
| -0.52041311 | -0.3745923 | -0.2002149 | 73.051 |
| -0.44192127 | -0.3251816 | -0.1792676 | 73.184 |
| -0.36666819 | -0.2780542 | -0.1585225 | 69.963 |
| -0.29986320 | -0.2357641 | -0.1382598 | 66.287 |
| -0.24538467 | -0.1998235 | -0.1191403 | 62.752 |
| -0.20560849 | -0.1711084 | -0.1023805 | 58.553 |
| -0.18094446 | -0.1499001 | -0.0891122 | 53.031 |
| -0.16972926 | -0.1359054 | -0.0797703 | 47.064 |
| -0.16875876 | -0.1284000 | -0.0740287 | 40.300 |
| -0.17375470 | -0.1259223 | -0.0707613 | 31.738 |
| -0.17978567 | -0.1258799 | -0.0681551 | 22.874 |
| -0.18217497 | -0.1249728 | -0.0644623 | 14.975 |
| -0.17723160 | -0.1199500 | -0.0585824 | 8.148 |
| -0.16243181 | -0.1082220 | -0.0500247 | 1.887 |
| -0.13635550 | -0.0883157 | -0.0386045 | -2.925 |
| -0.09891953 | -0.0603785 | -0.0244954 | -5.750 |
| -0.05148858 | -0.0261563 | -0.0082554 | -8.357 |
| 0.00354798 | 0.0118695 | 0.0095266 | -10.985 |
| 0.06300542 | 0.0511697 | 0.0282182 | -13.535 |
| 0.12318489 | 0.0896226 | 0.0470617 | -17.195 |
| 0.18068004 | 0.1260562 | 0.0655393 | -23.728 |
| 0.23325742 | 0.1605046 | 0.0837443 | -31.026 |
| 0.27973515 | 0.1933554 | 0.1018002 | -37.261 |
| 0.31976064 | 0.2246027 | 0.1194263 | -44.333 |
| 0.35423991 | 0.2541848 | 0.1364547 | -52.741 |
| 0.38523876 | 0.2822574 | 0.1530262 | -60.924 |
| 0.41508118 | 0.3089586 | 0.1691304 | -67.445 |
| 0.44538474 | 0.3341290 | 0.1842203 | -71.856 |
| 0.47648812 | 0.3572113 | 0.1972877 | -73.877 |
| 0.50722174 | 0.3771878 | 0.2071847 | -73.743 |
| 0.53496375 | 0.3925442 | 0.2129429 | -70.341 |
| 0.55562954 | 0.4010223 | 0.2136518 | -63.301 |
| 0.56406859 | 0.3997380 | 0.2084106 | -54.439 |
| 0.55520457 | 0.3860423 | 0.1967530 | -46.038 |
| 0.52517101 | 0.3583573 | 0.1788821 | -36.139 |
| 0.47147614 | 0.3159842 | 0.1549821 | -25.537 |
| 0.39369139 | 0.2594013 | 0.1253352 | -18.278 |
| 0.29462123 | 0.1910975 | 0.0912186 | -13.448 |
| 0.17994595 | 0.1150534 | 0.0545507 | -8.072 |
| 0.05693590 | 0.0355577 | 0.0169823 | -2.801 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| -0.06627724 | -0.0431303 | -0.0200607 | 1.933 |
| -0.18151585 | -0.1169682 | -0.0551857 | 7.356 |
| -0.28174026 | -0.1825844 | -0.0871952 | 13.200 |
| -0.36174706 | -0.2373224 | -0.1149684 | 18.337 |
| -0.41840628 | -0.2790786 | -0.1372827 | 23.672 |
| -0.45110645 | -0.3067134 | -0.1532837 | 31.137 |
| -0.46195765 | -0.3205787 | -0.1630164 | 37.961 |
| -0.45470792 | -0.3219883 | -0.1668698 | 43.541 |
| -0.43394510 | -0.3130099 | -0.1654377 | 49.478 |
| -0.40476365 | -0.2965868 | -0.1598329 | 53.488 |
| -0.37171059 | -0.2757144 | -0.1511670 | 54.393 |
| -0.33796738 | -0.2526467 | -0.1401463 | 51.869 |
| -0.30510902 | -0.2285721 | -0.1271112 | 47.558 |
| -0.27335212 | -0.2037797 | -0.1123606 | 39.839 |
| -0.24144875 | -0.1775253 | -0.0959032 | 31.149 |
| -0.20769924 | -0.1490348 | -0.0780854 | 26.394 |
| -0.17138373 | -0.1188441 | -0.0603272 | 21.790 |
| -0.13236784 | -0.0881270 | -0.0439107 | 17.596 |
| -0.09120936 | -0.0583418 | -0.0294916 | 14.366 |
| -0.04948094 | -0.0310645 | -0.0172639 | 12.466 |
| -0.00979172 | -0.0077374 | -0.0072548 | 11.330 |
| 0.02463173 | 0.0106153 | 0.0005215 | 11.291 |
| 0.05046803 | 0.0233498 | 0.0059043 | 11.311 |
| 0.06510185 | 0.0302093 | 0.0087558 | 11.607 |
| 0.06711241 | 0.0310947 | 0.0089887 | 11.869 |
| 0.05658009 | 0.0260112 | 0.0066507 | 11.784 |
| 0.03512184 | 0.0152178 | 0.0019947 | 11.203 |
| 0.00575219 | -0.0004145 | -0.0044169 | 8.054 |
| -0.02697854 | -0.0186345 | -0.0112552 | 1.251 |
| -0.05729811 | -0.0356443 | -0.0164749 | -5.970 |
| -0.07948217 | -0.0472182 | -0.0183223 | -13.164 |
| -0.08849650 | -0.0495006 | -0.0156165 | -20.997 |
| -0.08012149 | -0.0393940 | -0.0074424 | -29.702 |
| -0.05133818 | -0.0150722 | 0.0068562 | -35.821 |
| -0.00154168 | 0.0229627 | 0.0268306 | -38.259 |
| 0.06695684 | 0.0717979 | 0.0508075 | -39.824 |
| 0.14949638 | 0.1271899 | 0.0767267 | -39.264 |
| 0.23916900 | 0.1840389 | 0.1022496 | -37.066 |
| 0.32742606 | 0.2370196 | 0.1250257 | -33.905 |
| 0.40514333 | 0.2812511 | 0.1430661 | -30.714 |
| 0.46396724 | 0.3129054 | 0.1550993 | -28.867 |
| 0.49770268 | 0.3297074 | 0.1607963 | -28.321 |
| 0.50325819 | 0.3310722 | 0.1606039 | -30.375 |
| 0.48129727 | 0.3182165 | 0.1555922 | -33.195 |
| 0.43573645 | 0.2934972 | 0.1467292 | -35.404 |
| 0.37290092 | 0.2598254 | 0.1345569 | -38.569 |
| 0.30098986 | 0.2207696 | 0.1197864 | -42.417 |
| 0.22881948 | 0.1801965 | 0.1034473 | -43.596 |
| 0.16378920 | 0.1412047 | 0.0862581 | -41.381 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 0.11071931 | 0.1057828 | 0.0686324 | -37.789 |
| 0.07186651 | 0.0753116 | 0.0513362 | -33.712 |
| 0.04714496 | 0.0508210 | 0.0356177 | -28.411 |
| 0.03437513 | 0.0328005 | 0.0226950 | -22.889 |
| 0.03008094 | 0.0211869 | 0.0134071 | -16.454 |
| 0.03009255 | 0.0150083 | 0.0076795 | -8.639 |
| 0.03020044 | 0.0122244 | 0.0043995 | -1.694 |
| 0.02738453 | 0.0105495 | 0.0023130 | 0.888 |
| 0.02092215 | 0.0086617 | 0.0010701 | 0.296 |
| 0.01201734 | 0.0063207 | 0.0009262 | -1.683 |
| 0.00294985 | 0.0041174 | 0.0021227 | -5.560 |
| -0.00341808 | 0.0034267 | 0.0048191 | -9.306 |
| -0.00450728 | 0.0057150 | 0.0088211 | -12.454 |
| 0.00140426 | 0.0119374 | 0.0136709 | -13.954 |
| 0.01473618 | 0.0220382 | 0.0187794 | -14.165 |
| 0.03457487 | 0.0349874 | 0.0237151 | -13.375 |
| 0.05868825 | 0.0489920 | 0.0281815 | -9.894 |
| 0.08332627 | 0.0614894 | 0.0314977 | -4.649 |
| 0.10385338 | 0.0697935 | 0.0327512 | -0.178 |
| 0.11591208 | 0.0719895 | 0.0313685 | 4.097 |
| 0.11593389 | 0.0669261 | 0.0269924 | 8.748 |
| 0.10150243 | 0.0539735 | 0.0193128 | 12.862 |
| 0.07194281 | 0.0331398 | 0.0083222 | 15.575 |
| 0.02868290 | 0.0052624 | -0.0054456 | 16.930 |
| -0.02491996 | -0.0279937 | -0.0210158 | 17.220 |
| -0.08400675 | -0.0641487 | -0.0371352 | 15.278 |
| -0.14250170 | -0.0997158 | -0.0521582 | 11.312 |
| -0.19373088 | -0.1304492 | -0.0642074 | 5.938 |
| -0.23140607 | -0.1521430 | -0.0716634 | 2.939 |
| -0.25115428 | -0.1621194 | -0.0740881 | 2.684 |
| -0.25115138 | -0.1598241 | -0.0721392 | 4.210 |
| -0.23216083 | -0.1466933 | -0.0669652 | 8.193 |
| -0.19766542 | -0.1259597 | -0.0599978 | 13.995 |
| -0.15337394 | -0.1018143 | -0.0525847 | 18.621 |
| -0.10588559 | -0.0779517 | -0.0453427 | 21.238 |
| -0.06158176 | -0.0567872 | -0.0382278 | 22.140 |
| -0.02580022 | -0.0394524 | -0.0310696 | 21.800 |
| -0.00218413 | -0.0262621 | -0.0240443 | 21.263 |
| 0.00768221 | -0.0173617 | -0.0178587 | 19.773 |
| 0.00457825 | -0.0128934 | -0.0133254 | 17.611 |
| -0.00873004 | -0.0130616 | -0.0110758 | 15.572 |
| -0.02837142 | -0.0180070 | -0.0114654 | 13.059 |
| -0.05014600 | -0.0272675 | -0.0143437 | 10.416 |
| -0.07028184 | -0.0394323 | -0.0190299 | 6.810 |
| -0.08579976 | -0.0520267 | -0.0242989 | 3.862 |
| -0.09505323 | -0.0623195 | -0.0289446 | 2.976 |
| -0.09797351 | -0.0683781 | -0.0322953 | 4.315 |
| -0.09580002 | -0.0697211 | -0.0342900 | 7.667 |
| -0.09065138 | -0.0674959 | -0.0353634 | 12.628 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| -0.08505047 | -0.0640686 | -0.0362195 | 17.048 |
| -0.08112604 | -0.0618241 | -0.0372676 | 18.728 |
| -0.07991686 | -0.0619252 | -0.0382302 | 17.726 |
| -0.08123398 | -0.0638616 | -0.0383641 | 13.784 |
| -0.08355673 | -0.0654893 | -0.0366687 | 7.128 |
| -0.08416060 | -0.0636962 | -0.0321486 | 0.222 |
| -0.07978361 | -0.0556905 | -0.0243095 | -6.952 |
| -0.06705948 | -0.0397454 | -0.0130948 | -12.983 |
| -0.04337697 | -0.0158013 | 0.0009964 | -16.513 |
| -0.00782252 | 0.0143977 | 0.0168143 | -18.140 |
| 0.03842907 | 0.0479698 | 0.0329110 | -18.294 |
| 0.09198876 | 0.0816385 | 0.0478278 | -16.401 |
| 0.14742497 | 0.1122096 | 0.0602071 | -14.524 |
| 0.19841131 | 0.1373108 | 0.0693395 | -13.491 |
| 0.23899727 | 0.1556681 | 0.0753426 | -13.615 |
| 0.26472152 | 0.1669681 | 0.0789197 | -14.778 |
| 0.27335117 | 0.1714907 | 0.0808583 | -15.984 |
| 0.26507994 | 0.1696729 | 0.0814984 | -17.759 |
| 0.24259934 | 0.1621844 | 0.0808056 | -20.938 |
| 0.21081968 | 0.1502543 | 0.0787702 | -25.414 |
| 0.17587828 | 0.1356689 | 0.0755348 | -28.660 |
| 0.14341348 | 0.1201112 | 0.0709860 | -29.152 |
| 0.11722170 | 0.1046759 | 0.0646875 | -27.560 |
| 0.09883604 | 0.0899294 | 0.0563863 | -24.146 |
| 0.08752976 | 0.0759728 | 0.0463200 | -19.205 |
| 0.08072600 | 0.0625335 | 0.0352053 | -13.646 |
| 0.07489128 | 0.0492517 | 0.0241006 | -8.679 |
| 0.06665968 | 0.0360224 | 0.0141785 | -4.891 |
| 0.05373796 | 0.0230850 | 0.0063408 | -2.117 |
| 0.03535798 | 0.0108040 | 0.0008269 | 0.070 |
| 0.01239474 | -0.0005530 | -0.0028288 | 0.463 |
| -0.01259600 | -0.0106486 | -0.0052644 | -0.327 |
| -0.03613104 | -0.0192225 | -0.0071082 | -0.251 |
| -0.05506757 | -0.0264344 | -0.0091206 | 0.382 |
| -0.06733865 | -0.0326339 | -0.0118952 | 1.720 |
| -0.07238716 | -0.0380971 | -0.0156292 | 3.256 |
| -0.07113218 | -0.0427880 | -0.0199840 | 4.853 |
| -0.06570468 | -0.0464419 | -0.0242799 | 7.648 |
| -0.05916508 | -0.0490581 | -0.0280370 | 11.262 |
| -0.05476984 | -0.0510925 | -0.0311404 | 14.952 |
| -0.05519480 | -0.0534401 | -0.0337974 | 18.985 |
| -0.06215269 | -0.0574035 | -0.0365620 | 22.404 |
| -0.07602467 | -0.0641979 | -0.0400087 | 23.941 |
| -0.09570130 | -0.0743048 | -0.0443464 | 24.075 |
| -0.11895044 | -0.0872349 | -0.0494132 | 22.292 |
| -0.14274575 | -0.1013867 | -0.0546085 | 19.312 |
| -0.16377562 | -0.1143742 | -0.0590583 | 15.634 |
| -0.17892542 | -0.1236089 | -0.0618354 | 12.536 |
| -0.18587063 | -0.1271347 | -0.0623427 | 11.367 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| -0.18353245 | -0.1242714 | -0.0605590 | 11.012 |
| -0.17200517 | -0.1155336 | -0.0567815 | 12.355 |
| -0.15275909 | -0.1026114 | -0.0517087 | 15.220 |
| -0.12855722 | -0.0879690 | -0.0463374 | 18.368 |
| -0.10287731 | -0.0740351 | -0.0415310 | 20.205 |
| -0.07914947 | -0.0624590 | -0.0376353 | 21.067 |
| -0.06038885 | -0.0540730 | -0.0346806 | 21.829 |
| -0.04896935 | -0.0492273 | -0.0327423 | 22.223 |
| -0.04618499 | -0.0479438 | -0.0319300 | 21.822 |
| -0.05183186 | -0.0498893 | -0.0321649 | 19.508 |
| -0.06394485 | -0.0541524 | -0.0329046 | 15.614 |
| -0.07916709 | -0.0593058 | -0.0333274 | 11.211 |
| -0.09347891 | -0.0636271 | -0.0326987 | 5.873 |
| -0.10276218 | -0.0651552 | -0.0304211 | 1.046 |
| -0.10367753 | -0.0622070 | -0.0263013 | -2.388 |
| -0.09434234 | -0.0538837 | -0.0206081 | -4.305 |
| -0.07453026 | -0.0402279 | -0.0137868 | -5.804 |
| -0.04536595 | -0.0219260 | -0.0059888 | -7.463 |
| -0.00887586 | 0.0001064 | 0.0031058 | -10.510 |
| 0.03264115 | 0.0252356 | 0.0142408 | -14.690 |
| 0.07690605 | 0.0531161 | 0.0280163 | -18.385 |
| 0.12157889 | 0.0831536 | 0.0441223 | -20.757 |
| 0.16429110 | 0.1140428 | 0.0611472 | -21.840 |
| 0.20277090 | 0.1436020 | 0.0769906 | -21.185 |
| 0.23473951 | 0.1687871 | 0.0893804 | -18.928 |
| 0.25782341 | 0.1861572 | 0.0964388 | -15.886 |
| 0.26964999 | 0.1927480 | 0.0971635 | -12.793 |
| 0.26806357 | 0.1869138 | 0.0915729 | -10.059 |
| 0.25148906 | 0.1688093 | 0.0805456 | -8.345 |
| 0.21956433 | 0.1404939 | 0.0656328 | -8.441 |
| 0.17384395 | 0.1056198 | 0.0488853 | -10.207 |
| 0.11809273 | 0.0686308 | 0.0324799 | -12.832 |
| 0.05797668 | 0.0337456 | 0.0182098 | -15.035 |
| 0.00019823 | 0.0041028 | 0.0070485 | -16.339 |
| -0.04860090 | -0.0185578 | -0.0009109 | -16.078 |
| -0.08314644 | -0.0338957 | -0.0063428 | -13.590 |
| -0.10066288 | -0.0426993 | -0.0103765 | -10.020 |
| -0.10124498 | -0.0462202 | -0.0139358 | -5.547 |
| -0.08783239 | -0.0458018 | -0.0174318 | -0.339 |
| -0.06563775 | -0.0427477 | -0.0207683 | 4.839 |
| -0.04099674 | -0.0382447 | -0.0234739 | 9.699 |
| -0.02004688 | -0.0334101 | -0.0250162 | 13.184 |
| -0.00736680 | -0.0291909 | -0.0249973 | 14.944 |
| -0.00517349 | -0.0263732 | -0.0234224 | 15.856 |
| -0.01329719 | -0.0257330 | -0.0209724 | 15.572 |
| -0.02946630 | -0.0278600 | -0.0187610 | 14.556 |
| -0.05014823 | -0.0330698 | -0.0180187 | 13.897 |
| -0.07167664 | -0.0414126 | -0.0197950 | 13.153 |
| -0.09099020 | -0.0524185 | -0.0244384 | 12.546 |

TABEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| -0.10619488 | -0.0650569 | -0.0314332 | 12.551 |
| -0.11682021 | -0.0779332 | -0.0396214 | 13.045 |
| -0.12354189 | -0.0894887 | -0.0475096 | 13.555 |
| -0.12753770 | -0.0982028 | -0.0535910 | 13.835 |
| -0.12982923 | -0.1028724 | -0.0567084 | 13.818 |
| -0.13083909 | -0.1028996 | -0.0563638 | 13.800 |
| -0.13028947 | -0.0984835 | -0.0528685 | 13.579 |
| -0.12730842 | -0.0905022 | -0.0471520 | 13.060 |
| -0.12078046 | -0.0802111 | -0.0404060 | 12.204 |
| -0.10981073 | -0.0688601 | -0.0337023 | 10.860 |
| -0.09404614 | -0.0572694 | -0.0276266 | 8.265 |
| -0.07365190 | -0.0454201 | -0.0219761 | 4.294 |
| -0.04928821 | -0.0325376 | -0.0159469 | 1.117 |
| -0.02243285 | -0.0179624 | -0.0089844 | 0.059 |
| 0.00464140 | -0.0018888 | -0.0013036 | 0.269 |
| 0.02948623 | 0.0145978 | 0.0063696 | 0.970 |
| 0.05005559 | 0.0298144 | 0.0132189 | 1.469 |
| 0.06502601 | 0.0419691 | 0.0186344 | 1.433 |
| 0.07379559 | 0.0496410 | 0.0222555 | 1.429 |
| 0.07621413 | 0.0520298 | 0.0237949 | 1.190 |
| 0.07251733 | 0.0491885 | 0.0231022 | 0.362 |
| 0.06340708 | 0.0420700 | 0.0203558 | -1.172 |
| 0.05006495 | 0.0322434 | 0.0161149 | -2.294 |
| 0.03388049 | 0.0212515 | 0.0110273 | -2.530 |
| 0.01640287 | 0.0103200 | 0.0057496 | -4.210 |
| -0.00018594 | 0.0008246 | 0.0013582 | -7.168 |
| -0.01329599 | -0.0057372 | -0.0009578 | -9.305 |
| -0.02078742 | -0.0083349 | -0.0007210 | -9.855 |
| -0.02150577 | -0.0067236 | 0.0015855 | -9.340 |
| -0.01539522 | -0.0014268 | 0.0049019 | -7.376 |
| -0.00360890 | 0.0062409 | 0.0079990 | -4.760 |
| 0.01174151 | 0.0145245 | 0.0100216 | -2.390 |
| 0.02794117 | 0.0216848 | 0.0107359 | 0.657 |
| 0.04183243 | 0.0261628 | 0.0101957 | 3.103 |
| 0.05059143 | 0.0271560 | 0.0087772 | 3.141 |
| 0.05265741 | 0.0250989 | 0.0072838 | 1.795 |
| 0.04789140 | 0.0212159 | 0.0064273 | 0.194 |
| 0.03743480 | 0.0168236 | 0.0064081 | -1.741 |
| 0.02367837 | 0.0130478 | 0.0071016 | -5.053 |
| 0.00994153 | 0.0107215 | 0.0083531 | -5.822 |
| -0.00095451 | 0.0096332 | 0.0094424 | -5.643 |
| -0.00707442 | 0.0090684 | 0.0096425 | -5.664 |
| -0.00752556 | 0.0085086 | 0.0087501 | -4.996 |
| -0.00284555 | 0.0077068 | 0.0069194 | -3.581 |
| 0.00506866 | 0.0066515 | 0.0044726 | -1.554 |
| 0.01347012 | 0.0054389 | 0.0017820 | 0.670 |
| 0.01951734 | 0.0041082 | -0.0007875 | 2.772 |
| 0.02090907 | 0.0024144 | -0.0030254 | 5.748 |
| 0.01612561 | -0.0004413 | -0.0051633 | 8.264 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 0.00486121 | -0.0054003 | -0.0076026 | 9.785 |
| -0.01198700 | -0.0131490 | -0.0107389 | 11.385 |
| -0.03285926 | -0.0240299 | -0.0150442 | 12.113 |
| -0.05571990 | -0.0376311 | -0.0206840 | 11.376 |
| -0.07828711 | -0.0526497 | -0.0272669 | 10.779 |
| -0.09864683 | -0.0674470 | -0.0341794 | 10.657 |
| -0.11545125 | -0.0804413 | -0.0407140 | 10.181 |
| -0.12772896 | -0.0902286 | -0.0460045 | 10.140 |
| -0.13495523 | -0.0959328 | -0.0493397 | 10.541 |
| -0.13700105 | -0.0973066 | -0.0503559 | 10.869 |
| -0.13403571 | -0.0946356 | -0.0490843 | 12.109 |
| -0.12685070 | -0.0889486 | -0.0462383 | 15.523 |
| -0.11714133 | -0.0821214 | -0.0432474 | 18.940 |
| -0.10698627 | -0.0761633 | -0.0414219 | 21.827 |
| -0.09849025 | -0.0727024 | -0.0414460 | 23.799 |
| -0.09335423 | -0.0725027 | -0.0431269 | 22.387 |
| -0.09204757 | -0.0747684 | -0.0451252 | 18.500 |
| -0.09370469 | -0.0774008 | -0.0456242 | 13.160 |
| -0.09623004 | -0.0776347 | -0.0430917 | 6.138 |
| -0.09644451 | -0.0727071 | -0.0366558 | 0.497 |
| -0.09111261 | -0.0611349 | -0.0267322 | -2.864 |
| -0.07777402 | -0.0432994 | -0.0148498 | -4.491 |
| -0.05522785 | -0.0211350 | -0.0028441 | -4.942 |
| -0.02389049 | 0.0026470 | 0.0078793 | -5.199 |
| 0.01410871 | 0.0255080 | 0.0167395 | -5.010 |
| 0.05499233 | 0.0456273 | 0.0237769 | -4.702 |
| 0.09399116 | 0.0621898 | 0.0293990 | -5.195 |
| 0.12654926 | 0.0754367 | 0.0342983 | -7.277 |
| 0.14965461 | 0.0864605 | 0.0394360 | -12.063 |
| 0.16288660 | 0.0969016 | 0.0459887 | -18.476 |
| 0.16838786 | 0.1082386 | 0.0547707 | -24.701 |
| 0.17004566 | 0.1211746 | 0.0656579 | -30.678 |
| 0.17250166 | 0.1356361 | 0.0776456 | -34.870 |
| 0.17973221 | 0.1507809 | 0.0890313 | -37.376 |
| 0.19398618 | 0.1653507 | 0.0980493 | -37.997 |
| 0.21508412 | 0.1779703 | 0.1034364 | -36.604 |
| 0.24029349 | 0.1873515 | 0.1047461 | -34.022 |
| 0.26500778 | 0.1925731 | 0.1024853 | -30.960 |
| 0.28390487 | 0.1932386 | 0.0978920 | -28.251 |
| 0.29226084 | 0.1894632 | 0.0924354 | -25.575 |
| 0.28691972 | 0.1815404 | 0.0871046 | -23.102 |
| 0.26696190 | 0.1696881 | 0.0820444 | -20.843 |
| 0.23384330 | 0.1539145 | 0.0765879 | -18.742 |
| 0.19096934 | 0.1340610 | 0.0696165 | -16.797 |
| 0.14285102 | 0.1100391 | 0.0600811 | -14.772 |
| 0.09402416 | 0.0821059 | 0.0474185 | -12.244 |
| 0.04805780 | 0.0510666 | 0.0317522 | -9.324 |
| 0.00706233 | 0.0184308 | 0.0139835 | -6.407 |
| -0.02823968 | -0.0136098 | -0.0042836 | -3.785 |

TABEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| -0.05811450 | -0.0425493 | -0.0211095 | -0.625 |
| -0.08346141 | -0.0663525 | -0.0349242 | 3.563 |
| -0.10532401 | -0.0840568 | -0.0449905 | 7.526 |
| -0.12415997 | -0.0956951 | -0.0512374 | 10.393 |
| -0.13946555 | -0.1019368 | -0.0539796 | 11.786 |
| -0.14997711 | -0.1037286 | -0.0537952 | 12.858 |
| -0.15448750 | -0.1022428 | -0.0516952 | 14.619 |
| -0.15264374 | -0.0988431 | -0.0490968 | 16.798 |
| -0.14518871 | -0.0947922 | -0.0473042 | 18.442 |
| -0.13375307 | -0.0909205 | -0.0469059 | 19.682 |
| -0.12062391 | -0.0876482 | -0.0476943 | 20.739 |
| -0.10837633 | -0.0851334 | -0.0489535 | 21.501 |
| -0.09932951 | -0.0833566 | -0.0498437 | 21.870 |
| -0.09504601 | -0.0822126 | -0.0497834 | 22.043 |
| -0.09606247 | -0.0816606 | -0.0487261 | 22.020 |
| -0.10184975 | -0.0818199 | -0.0471661 | 22.073 |
| -0.11108715 | -0.0830428 | -0.0459692 | 22.437 |
| -0.12214212 | -0.0858875 | -0.0460869 | 23.338 |
| -0.13361144 | -0.0909796 | -0.0482663 | 24.795 |
| -0.14461038 | -0.0986581 | -0.0527171 | 24.804 |
| -0.15436717 | -0.1081895 | -0.0585483 | 21.931 |
| -0.16177972 | -0.1173808 | -0.0637410 | 17.518 |
| -0.16544558 | -0.1231319 | -0.0659904 | 11.574 |
| -0.16349499 | -0.1221073 | -0.0633760 | 5.086 |
| -0.15375826 | -0.1117384 | -0.0550060 | 0.297 |
| -0.13441472 | -0.0913270 | -0.0415082 | -2.785 |
| -0.10444708 | -0.0623048 | -0.0246885 | -3.859 |
| -0.06417480 | -0.0278998 | -0.0069105 | -3.797 |
| -0.01553206 | 0.0078383 | 0.0096914 | -3.410 |
| 0.03788502 | 0.0411294 | 0.0237199 | -2.762 |
| 0.09100265 | 0.0691632 | 0.0345328 | -2.009 |
| 0.13797315 | 0.0904152 | 0.0421010 | -2.091 |
| 0.17342100 | 0.1046880 | 0.0469535 | -3.297 |
| 0.19359090 | 0.1126700 | 0.0499109 | -4.737 |
| 0.19701655 | 0.1152134 | 0.0516267 | -6.988 |
| 0.18501141 | 0.1131362 | 0.0525436 | -10.561 |
| 0.16151825 | 0.1072947 | 0.0529211 | -14.066 |
| 0.13198513 | 0.0984585 | 0.0525716 | -16.840 |
| 0.10211786 | 0.0874410 | 0.0509637 | -19.627 |
| 0.07702793 | 0.0755348 | 0.0478292 | -22.756 |
| 0.06056137 | 0.0646589 | 0.0436100 | -25.643 |
| 0.05474033 | 0.0569774 | 0.0393739 | -27.203 |
| 0.05950460 | 0.0542211 | 0.0363498 | -27.171 |
| 0.07302053 | 0.0572031 | 0.0355281 | -25.959 |
| 0.09234072 | 0.0656134 | 0.0373907 | -23.277 |
| 0.11404984 | 0.0779974 | 0.0416986 | -21.035 |
| 0.13520089 | 0.0923832 | 0.0478277 | -19.775 |
| 0.15381835 | 0.1068403 | 0.0549932 | -20.039 |
| 0.16904711 | 0.1199308 | 0.0624206 | -21.397 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 0.18086727 | 0.1307986 | 0.0693341 | -22.727 |
| 0.18959340 | 0.1389759 | 0.0749051 | -24.147 |
| 0.19561975 | 0.1443104 | 0.0784945 | -24.997 |
| 0.19904799 | 0.1466670 | 0.0796848 | -23.895 |
| 0.19921746 | 0.1454801 | 0.0780517 | -20.487 |
| 0.19466178 | 0.1397204 | 0.0731770 | -16.213 |
| 0.18369585 | 0.1284785 | 0.0650605 | -12.673 |
| 0.16521509 | 0.1116950 | 0.0544681 | -11.297 |
| 0.13936591 | 0.0906276 | 0.0429170 | -11.583 |
| 0.10765507 | 0.0675921 | 0.0320768 | -12.691 |
| 0.07278780 | 0.0453422 | 0.0231715 | -14.379 |
| 0.03838326 | 0.0264205 | 0.0167486 | -15.230 |
| 0.00830569 | 0.0124407 | 0.0125989 | -15.702 |
| -0.01387263 | 0.0039582 | 0.0101739 | -15.258 |
| -0.02567906 | 0.0004751 | 0.0088092 | -13.101 |
| -0.02648229 | 0.0006622 | 0.0078089 | -10.452 |
| -0.01752688 | 0.0030729 | 0.0067934 | -7.534 |
| -0.00175054 | 0.0065408 | 0.0057068 | -4.023 |
| 0.01664894 | 0.0101732 | 0.0045846 | -0.532 |
| 0.03318745 | 0.0133690 | 0.0035576 | 1.635 |
| 0.04425106 | 0.0158445 | 0.0029529 | 3.152 |
| 0.04760526 | 0.0172298 | 0.0029246 | 4.837 |
| 0.04247560 | 0.0167490 | 0.0031001 | 6.476 |
| 0.02951033 | 0.0133884 | 0.0026743 | 7.729 |
| 0.01054584 | 0.0063521 | 0.0007892 | 7.746 |
| -0.01172333 | -0.0043693 | -0.0029648 | 6.555 |
| -0.03433495 | -0.0178063 | -0.0083789 | 5.199 |
| -0.05481769 | -0.0323533 | -0.0148756 | 4.808 |
| -0.07171327 | -0.0463238 | -0.0218195 | 5.253 |
| -0.08454077 | -0.0582976 | -0.0285449 | 6.337 |
| -0.09352622 | -0.0673661 | -0.0343764 | 7.968 |
| -0.09935208 | -0.0733094 | -0.0387947 | 10.523 |
| -0.10307067 | -0.0767171 | -0.0417380 | 14.167 |
| -0.10603479 | -0.0788899 | -0.0437455 | 18.417 |
| -0.10974715 | -0.0814991 | -0.0457903 | 23.157 |
| -0.11576088 | -0.0862441 | -0.0489932 | 27.590 |
| -0.12543483 | -0.0944105 | -0.0541663 | 31.146 |
| -0.13966475 | -0.1065174 | -0.0614705 | 33.273 |
| -0.15861129 | -0.1221074 | -0.0703032 | 33.880 |
| -0.18152954 | -0.1397822 | -0.0794907 | 33.064 |
| -0.20666495 | -0.1574054 | -0.0876128 | 30.542 |
| -0.23113005 | -0.1723002 | -0.0932057 | 25.894 |
| -0.25096917 | -0.1815352 | -0.0949201 | 20.351 |
| -0.26176756 | -0.1825506 | -0.0919006 | 14.287 |
| -0.25937899 | -0.1736388 | -0.0839421 | 9.261 |
| -0.24100687 | -0.1545298 | -0.0717241 | 6.959 |
| -0.20618949 | -0.1267246 | -0.0568201 | 6.395 |
| -0.15693883 | -0.0929802 | -0.0410138 | 6.872 |
| -0.09753116 | -0.0566382 | -0.0257409 | 8.321 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| -0.03411566 | -0.0211465 | -0.0119927 | 10.682 |
| 0.02605075 | 0.0103165 | -0.0004378 | 13.042 |
| 0.07587816 | 0.0352930 | 0.0085915 | 13.979 |
| 0.10988635 | 0.0524272 | 0.0151792 | 13.268 |
| 0.12512748 | 0.0613837 | 0.0195994 | 11.699 |
| 0.12140539 | 0.0624204 | 0.0219089 | 9.921 |
| 0.10112656 | 0.0561513 | 0.0218775 | 6.530 |
| 0.06915055 | 0.0439037 | 0.0195403 | 1.391 |
| 0.03185014 | 0.0277145 | 0.0153309 | -1.887 |
| -0.00464675 | 0.0096445 | 0.0095448 | -5.475 |
| -0.03496562 | -0.0078439 | 0.0029167 | -9.534 |
| -0.05505100 | -0.0219850 | -0.0032788 | -11.594 |
| -0.06300766 | -0.0305810 | -0.0079005 | -12.156 |
| -0.05903318 | -0.0323722 | -0.0101228 | -11.036 |
| -0.04507050 | -0.0273212 | -0.0096058 | -8.463 |
| -0.02424542 | -0.0166362 | -0.0065519 | -5.403 |
| -0.00011306 | -0.0023846 | -0.0015374 | -2.648 |
| 0.02397257 | 0.0130391 | 0.0046544 | -0.544 |
| 0.04527302 | 0.0274241 | 0.0111550 | 0.108 |
| 0.06197177 | 0.0392110 | 0.0172011 | 0.028 |
| 0.07307190 | 0.0475014 | 0.0220843 | -0.549 |
| 0.07830691 | 0.0519903 | 0.0252450 | -1.813 |
| 0.07808279 | 0.0528770 | 0.0264509 | -2.808 |
| 0.07315329 | 0.0505283 | 0.0256946 | -3.264 |
| 0.06440597 | 0.0453220 | 0.0231484 | -3.457 |
| 0.05279154 | 0.0377035 | 0.0191815 | -3.225 |
| 0.03915190 | 0.0281522 | 0.0142020 | -1.932 |
| 0.02399544 | 0.0170386 | 0.0084191 | 0.056 |
| 0.00758339 | 0.0046963 | 0.0019237 | 1.938 |
| -0.00981633 | -0.0084207 | -0.0050815 | 3.696 |
| -0.02781937 | -0.0217565 | -0.0122405 | 5.046 |
| -0.04579865 | -0.0346345 | -0.0190360 | 5.607 |
| -0.06271268 | -0.0461455 | -0.0247652 | 4.524 |
| -0.07697783 | -0.0550367 | -0.0285593 | 2.942 |
| -0.08688083 | -0.0601192 | -0.0298526 | 1.993 |
| -0.09105020 | -0.0607164 | -0.0287105 | 1.211 |
| -0.08855421 | -0.0566920 | -0.0255878 | 0.451 |
| -0.07900631 | -0.0484055 | -0.0210229 | -0.162 |
| -0.06272897 | -0.0366488 | -0.0154764 | -0.633 |
| -0.04082037 | -0.0224773 | -0.0092699 | -1.035 |
| -0.01507668 | -0.0069941 | -0.0026137 | -1.419 |
| 0.01223349 | 0.0088193 | 0.0043193 | -2.040 |
| 0.03874655 | 0.0242107 | 0.0113625 | -2.971 |
| 0.06236293 | 0.0386059 | 0.0183030 | -3.820 |
| 0.08143371 | 0.0513914 | 0.0247647 | -4.208 |
| 0.09481697 | 0.0617295 | 0.0301550 | -3.933 |
| 0.10182569 | 0.0685249 | 0.0337180 | -2.747 |
| 0.10208126 | 0.0705511 | 0.0346595 | -1.099 |
| 0.09548396 | 0.0668372 | 0.0324370 | 0.364 |

TABEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 0.08223345 | 0.0570748 | 0.0270030 | 1.786 |
| 0.06274583 | 0.0417281 | 0.0187635 | 3.092 |
| 0.03767721 | 0.0219736 | 0.0084618 | 4.317 |
| 0.00804072 | -0.0005053 | -0.0029571 | 5.101 |
| -0.02455988 | -0.0237069 | -0.0143913 | 4.970 |
| -0.05778564 | -0.0455125 | -0.0246586 | 4.530 |
| -0.08879658 | -0.0640520 | -0.0327970 | 3.880 |
| -0.11456284 | -0.0778841 | -0.0382194 | 2.971 |
| -0.13227090 | -0.0860595 | -0.0407420 | 2.598 |
| -0.13992780 | -0.0882793 | -0.0406542 | 2.796 |
| -0.13676377 | -0.0848782 | -0.0385597 | 3.671 |
| -0.12345569 | -0.0767588 | -0.0351702 | 5.300 |
| -0.10215029 | -0.0653167 | -0.0311690 | 7.783 |
| -0.07622232 | -0.0523041 | -0.0271398 | 10.349 |
| -0.04964278 | -0.0394853 | -0.0234230 | 12.473 |
| -0.02627765 | -0.0283508 | -0.0201254 | 14.039 |
| -0.00925143 | -0.0199509 | -0.0172483 | 14.174 |
| -0.00029525 | -0.0146760 | -0.0146766 | 12.967 |
| 0.00052120 | -0.0122864 | -0.0122777 | 10.471 |
| -0.00527188 | -0.0120589 | -0.0099691 | 7.368 |
| -0.01497374 | -0.0130488 | -0.0077843 | 3.819 |
| -0.02524684 | -0.0142256 | -0.0057663 | 0.199 |
| -0.03287563 | -0.0146934 | -0.0039669 | -1.454 |
| -0.03575888 | -0.0141337 | -0.0026996 | -1.980 |
| -0.03310811 | -0.0125826 | -0.0021891 | -2.201 |
| -0.02529467 | -0.0100935 | -0.0022406 | -2.172 |
| -0.01364415 | -0.0066395 | -0.0022987 | -2.170 |
| -0.00005187 | -0.0021167 | -0.0016807 | -1.925 |
| 0.01341622 | 0.0034843 | 0.0000697 | -1.606 |
| 0.02498097 | 0.0099459 | 0.0029988 | -1.195 |
| 0.03345689 | 0.0167111 | 0.0067005 | -0.656 |
| 0.03835384 | 0.0228801 | 0.0104298 | -0.203 |
| 0.03984514 | 0.0274257 | 0.0133819 | -0.265 |
| 0.03863589 | 0.0295650 | 0.0150124 | -0.940 |
| 0.03572155 | 0.0290780 | 0.0152086 | -2.435 |
| 0.03220285 | 0.0265165 | 0.0143435 | -4.678 |
| 0.02914025 | 0.0231356 | 0.0131471 | -7.088 |
| 0.02743313 | 0.0205220 | 0.0124298 | -9.579 |
| 0.02789005 | 0.0202163 | 0.0129262 | -12.155 |
| 0.03133199 | 0.0233827 | 0.0151977 | -14.507 |
| 0.03851105 | 0.0305022 | 0.0194659 | -15.973 |
| 0.04983260 | 0.0411682 | 0.0254266 | -16.414 |
| 0.06510636 | 0.0541735 | 0.0322770 | -15.794 |
| 0.08330726 | 0.0677301 | 0.0388591 | -13.567 |
| 0.10236796 | 0.0796699 | 0.0438193 | -10.495 |
| 0.11946207 | 0.0879417 | 0.0460806 | -7.777 |
| 0.13164785 | 0.0911990 | 0.0453320 | -6.322 |
| 0.13653388 | 0.0891390 | 0.0421428 | -5.816 |
| 0.13265980 | 0.0823530 | 0.0375342 | -5.693 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 0.11971122 | 0.0719378 | 0.0324216 | -5.712 |
| 0.09866500 | 0.0591422 | 0.0273124 | -5.977 |
| 0.07177574 | 0.0451401 | 0.0223246 | -6.374 |
| 0.04223742 | 0.0308756 | 0.0173326 | -6.669 |
| 0.01356869 | 0.0170089 | 0.0121355 | -6.529 |
| -0.01118421 | 0.0038980 | 0.0065230 | -4.768 |
| -0.03030621 | -0.0085143 | 0.0001693 | -1.621 |
| -0.04361424 | -0.0204278 | -0.0071071 | 0.930 |
| -0.05196293 | -0.0316369 | -0.0148551 | 3.310 |
| -0.05694160 | -0.0416060 | -0.0221894 | 5.342 |
| -0.06035039 | -0.0496362 | -0.0281005 | 6.526 |
| -0.06355059 | -0.0550023 | -0.0317065 | 7.058 |
| -0.06708676 | -0.0572159 | -0.0325614 | 7.026 |
| -0.07053656 | -0.0561719 | -0.0307678 | 6.107 |
| -0.07258124 | -0.0520868 | -0.0268340 | 4.761 |
| -0.07146187 | -0.0454421 | -0.0215291 | 2.937 |
| -0.06546360 | -0.0367498 | -0.0155856 | 0.443 |
| -0.05329054 | -0.0262408 | -0.0093714 | -3.043 |
| -0.03435049 | -0.0137185 | -0.0027716 | -6.036 |
| -0.00928646 | 0.0009553 | 0.0043334 | -6.692 |
| 0.01970643 | 0.0172257 | 0.0115685 | -5.878 |
| 0.04941557 | 0.0338619 | 0.0182883 | -4.248 |
| 0.07629217 | 0.0491417 | 0.0238581 | -1.945 |
| 0.09695047 | 0.0610456 | 0.0277079 | 0.740 |
| 0.10859055 | 0.0676112 | 0.0293361 | 3.211 |
| 0.10939205 | 0.0674192 | 0.0283831 | 4.913 |
| 0.09876184 | 0.0599626 | 0.0247027 | 6.084 |
| 0.07725423 | 0.0456177 | 0.0182780 | 7.474 |
| 0.04633105 | 0.0253693 | 0.0091566 | 8.382 |
| 0.00838303 | 0.0007792 | -0.0022454 | 8.337 |
| -0.03334109 | -0.0260674 | -0.0149453 | 7.617 |
| -0.07507560 | -0.0527771 | -0.0275587 | 6.374 |
| -0.11291964 | -0.0768355 | -0.0385872 | 4.644 |
| -0.14316682 | -0.0957575 | -0.0466788 | 2.399 |
| -0.16262954 | -0.1073211 | -0.0508457 | 0.536 |
| -0.16914009 | -0.1100723 | -0.0507624 | -0.086 |
| -0.16194956 | -0.1037584 | -0.0468507 | 0.054 |
| -0.14172477 | -0.0892981 | -0.0399343 | 0.716 |
| -0.11043622 | -0.0685342 | -0.0309071 | 1.451 |
| -0.07110936 | -0.0437897 | -0.0205135 | 1.825 |
| -0.02744265 | -0.0173628 | -0.0092859 | 1.501 |
| 0.01662955 | 0.0088248 | 0.0023538 | 1.029 |
| 0.05726591 | 0.0332059 | 0.0138256 | 0.575 |
| 0.09114290 | 0.0544657 | 0.0243358 | -0.108 |
| 0.11593118 | 0.0715131 | 0.0330830 | -1.314 |
| 0.13059408 | 0.0835072 | 0.0394969 | -2.791 |
| 0.13533153 | 0.0898772 | 0.0432893 | -4.427 |
| 0.13135670 | 0.0904727 | 0.0444548 | -6.489 |
| 0.12067650 | 0.0858424 | 0.0433265 | -9.321 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 0.10584434 | 0.0773882 | 0.0405841 | -12.358 |
| 0.08956681 | 0.0671302 | 0.0370623 | -15.403 |
| 0.07445020 | 0.0573496 | 0.0336421 | -18.417 |
| 0.06277531 | 0.0501113 | 0.0311227 | -19.726 |
| 0.05598056 | 0.0465220 | 0.0298120 | -19.227 |
| 0.05457426 | 0.0465894 | 0.0295858 | -18.796 |
| 0.05852939 | 0.0497798 | 0.0303888 | -18.412 |
| 0.06731998 | 0.0553387 | 0.0322548 | -18.045 |
| 0.07990034 | 0.0625052 | 0.0351445 | -17.683 |
| 0.09479784 | 0.0706384 | 0.0388368 | -17.326 |
| 0.11031065 | 0.0792034 | 0.0429289 | -16.958 |
| 0.12474821 | 0.0876509 | 0.0469230 | -16.467 |
| 0.13657629 | 0.0952232 | 0.0502762 | -14.987 |
| 0.14431941 | 0.1007021 | 0.0522879 | -12.296 |
| 0.14656817 | 0.1025088 | 0.0521733 | -9.461 |
| 0.14224595 | 0.0992521 | 0.0494120 | -6.858 |
| 0.13076765 | 0.0901997 | 0.0439201 | -5.097 |
| 0.11220707 | 0.0756159 | 0.0361113 | -4.210 |
| 0.08736330 | 0.0567492 | 0.0267628 | -3.920 |
| 0.05771389 | 0.0354825 | 0.0167616 | -3.548 |
| 0.02522279 | 0.0137573 | 0.0068166 | -2.553 |
| -0.00789271 | -0.0069198 | -0.0026751 | -1.096 |
| -0.03932948 | -0.0256241 | -0.0115102 | 0.543 |
| -0.06693595 | -0.0419207 | -0.0195352 | 2.491 |
| -0.08909749 | -0.0557318 | -0.0266591 | 4.941 |
| -0.10508260 | -0.0671933 | -0.0329155 | 7.781 |
| -0.11514240 | -0.0764905 | -0.0384198 | 10.662 |
| -0.12032821 | -0.0837369 | -0.0432322 | 13.186 |
| -0.12214331 | -0.0889655 | -0.0472549 | 15.439 |
| -0.12226894 | -0.0923282 | -0.0503499 | 18.181 |
| -0.12244118 | -0.0943989 | -0.0526215 | 21.273 |
| -0.12419801 | -0.0961589 | -0.0544502 | 24.281 |
| -0.12854981 | -0.0986667 | -0.0562833 | 25.725 |
| -0.13557782 | -0.1024639 | -0.0582360 | 25.576 |
| -0.14448053 | -0.1073633 | -0.0600897 | 24.472 |
| -0.15390023 | -0.1125806 | -0.0615255 | 22.670 |
| -0.16216407 | -0.1169204 | -0.0622147 | 20.075 |
| -0.16737087 | -0.1189261 | -0.0617209 | 16.268 |
| -0.16753862 | -0.1171258 | -0.0594776 | 13.448 |
| -0.16131771 | -0.1107810 | -0.0553214 | 12.131 |
| -0.14836296 | -0.1001718 | -0.0496314 | 11.763 |
| -0.12929190 | -0.0863493 | -0.0430429 | 11.764 |
| -0.10550178 | -0.0707027 | -0.0361237 | 11.437 |
| -0.07891610 | -0.0545291 | -0.0291855 | 11.043 |
| -0.05181346 | -0.0388722 | -0.0223906 | 10.309 |
| -0.02647306 | -0.0244068 | -0.0158150 | 9.117 |
| -0.00479219 | -0.0114694 | -0.0095077 | 7.656 |
| 0.01198081 | -0.0002333 | -0.0035764 | 5.991 |
| 0.02339404 | 0.0091354 | 0.0017892 | 4.383 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 0.02975026 | 0.0163893 | 0.0063207 | 2.712 |
| 0.03200201 | 0.0213243 | 0.0097959 | 0.592 |
| 0.03157977 | 0.0240149 | 0.0121909 | -1.654 |
| 0.03001766 | 0.0248624 | 0.0136302 | -3.632 |
| 0.02858008 | 0.0245027 | 0.0142808 | -5.086 |
| 0.02802802 | 0.0236327 | 0.0142934 | -5.728 |
| 0.02847103 | 0.0227257 | 0.0137275 | -4.762 |
| 0.02928765 | 0.0217263 | 0.0124567 | -3.140 |
| 0.02949855 | 0.0202284 | 0.0104303 | -1.542 |
| 0.02808114 | 0.0176964 | 0.0077683 | 0.917 |
| 0.02394593 | 0.0134397 | 0.0044742 | 3.453 |
| 0.01626391 | 0.0069666 | 0.0005276 | 4.788 |
| 0.00490490 | -0.0015911 | -0.0038623 | 5.252 |
| -0.00954611 | -0.0115446 | -0.0083600 | 5.156 |
| -0.02590609 | -0.0218887 | -0.0126371 | 4.615 |
| -0.04254427 | -0.0315446 | -0.0164119 | 4.049 |
| -0.05765450 | -0.0396167 | -0.0194942 | 3.545 |
| -0.06951081 | -0.0454902 | -0.0217471 | 2.983 |
| -0.07665796 | -0.0487551 | -0.0229936 | 2.014 |
| -0.07800956 | -0.0490233 | -0.0229271 | 0.451 |
| -0.07296477 | -0.0458648 | -0.0211790 | -0.777 |
| -0.06167639 | -0.0390741 | -0.0176399 | -1.349 |
| -0.04512038 | -0.0289086 | -0.0126064 | -0.946 |
| -0.02498759 | -0.0162275 | -0.0067286 | -0.240 |
| -0.00327158 | -0.0022817 | -0.0006583 | -0.220 |
| 0.01817571 | 0.0116578 | 0.0052587 | -0.437 |
| 0.03772527 | 0.0244259 | 0.0108456 | -0.895 |
| 0.05406095 | 0.0351332 | 0.0159468 | -1.705 |
| 0.06631059 | 0.0433181 | 0.0203823 | -2.938 |
| 0.07416244 | 0.0489830 | 0.0239910 | -4.742 |
| 0.07797458 | 0.0525638 | 0.0267649 | -7.404 |
| 0.07879499 | 0.0548337 | 0.0289504 | -10.138 |
| 0.07804747 | 0.0565763 | 0.0308572 | -12.403 |
| 0.07716429 | 0.0583374 | 0.0326673 | -13.958 |
| 0.07729000 | 0.0603482 | 0.0343702 | -14.754 |
| 0.07907123 | 0.0625610 | 0.0358021 | -14.839 |
| 0.08259163 | 0.0647762 | 0.0367800 | -15.018 |
| 0.08760608 | 0.0669536 | 0.0373898 | -16.124 |
| 0.09383447 | 0.0694364 | 0.0381240 | -17.553 |
| 0.10091504 | 0.0727005 | 0.0395206 | -18.064 |
| 0.10824379 | 0.0769116 | 0.0416972 | -18.121 |
| 0.11517166 | 0.0818631 | 0.0443851 | -17.739 |
| 0.12116500 | 0.0870080 | 0.0471031 | -17.588 |
| 0.12598783 | 0.0917026 | 0.0494624 | -17.940 |
| 0.12970366 | 0.0954340 | 0.0513060 | -18.425 |
| 0.13241714 | 0.0978418 | 0.0525567 | -18.089 |
| 0.13383557 | 0.0984870 | 0.0528817 | -15.727 |
| 0.13292573 | 0.0965680 | 0.0514980 | -12.049 |
| 0.12818383 | 0.0911185 | 0.0475963 | -8.429 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 0.11814587 | 0.0813865 | 0.0408705 | -4.429 |
| 0.10151593 | 0.0668399 | 0.0314550 | 0.038 |
| 0.07734703 | 0.0472477 | 0.0197516 | 3.973 |
| 0.04548240 | 0.0230160 | 0.0064492 | 6.842 |
| 0.00684174 | -0.0046708 | -0.0075665 | 8.925 |
| -0.03660242 | -0.0340513 | -0.0214505 | 10.230 |
| -0.08200796 | -0.0631182 | -0.0345408 | 11.725 |
| -0.12613508 | -0.0901092 | -0.0465039 | 13.144 |
| -0.16567026 | -0.1136420 | -0.0571264 | 14.091 |
| -0.19756564 | -0.1326613 | -0.0660821 | 15.038 |
| -0.21961460 | -0.1465259 | -0.0730437 | 16.921 |
| -0.23102235 | -0.1551649 | -0.0779578 | 19.692 |
| -0.23247637 | -0.1589625 | -0.0810118 | 22.164 |
| -0.22571169 | -0.1584288 | -0.0823273 | 24.337 |
| -0.21313515 | -0.1541783 | -0.0819461 | 26.230 |
| -0.19743622 | -0.1470157 | -0.0799530 | 27.953 |
| -0.18120671 | -0.1380003 | -0.0766125 | 29.422 |
| -0.16643576 | -0.1282296 | -0.0722667 | 28.015 |
| -0.15369992 | -0.1181110 | -0.0668032 | 24.589 |
| -0.14239049 | -0.1074994 | -0.0600078 | 21.841 |
| -0.13152944 | -0.0963257 | -0.0522339 | 18.571 |
| -0.11982589 | -0.0844340 | -0.0440353 | 14.531 |
| -0.10591550 | -0.0715911 | -0.0358497 | 11.680 |
| -0.08910804 | -0.0579975 | -0.0282095 | 10.113 |
| -0.06964072 | -0.0443125 | -0.0216012 | 8.799 |
| -0.04853361 | -0.0313345 | -0.0161915 | 8.794 |
| -0.02767321 | -0.0200353 | -0.0120722 | 9.566 |
| -0.00940939 | -0.0112901 | -0.0092505 | 9.683 |
| 0.00423164 | -0.0054127 | -0.0074134 | 8.592 |
| 0.01215709 | -0.0019927 | -0.0059312 | 6.114 |
| 0.01456250 | 0.0000047 | -0.0040347 | 2.418 |
| 0.01299956 | 0.0019811 | -0.0010397 | -2.214 |
| 0.01014921 | 0.0053951 | 0.0034821 | -7.141 |
| 0.00929648 | 0.0114474 | 0.0096062 | -12.078 |
| 0.01367968 | 0.0209005 | 0.0171120 | -16.197 |
| 0.02574746 | 0.0339518 | 0.0255587 | -19.842 |
| 0.04672377 | 0.0503915 | 0.0345543 | -22.643 |
| 0.07623411 | 0.0696277 | 0.0437864 | -23.824 |
| 0.11216303 | 0.0906290 | 0.0529048 | -24.325 |
| 0.15117034 | 0.1121863 | 0.0616847 | -24.449 |
| 0.18935360 | 0.1330605 | 0.0700322 | -24.489 |
| 0.22295310 | 0.1520584 | 0.0778859 | -24.752 |
| 0.24899377 | 0.1681054 | 0.0851092 | -25.284 |
| 0.26568461 | 0.1802764 | 0.0913837 | -25.971 |
| 0.27257157 | 0.1878628 | 0.0962161 | -27.374 |
| 0.27059732 | 0.1906266 | 0.0992013 | -29.749 |
| 0.26184579 | 0.1889395 | 0.1002076 | -32.027 |
| 0.24879734 | 0.1835048 | 0.0991910 | -32.832 |
| 0.23333822 | 0.1747778 | 0.0958165 | -29.518 |

TABLEAU DES DEPLACEMENTS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|--------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | |
| 0.21577795 | 0.1622671 | 0.0891051 | -23.447 |
| 0.19504047 | 0.1448776 | 0.0781191 | -16.628 |
| 0.16935417 | 0.1216378 | 0.0627503 | -9.434 |
| 0.13689909 | 0.0922498 | 0.0439119 | -4.942 |
| 0.09705623 | 0.0580450 | 0.0237922 | -4.168 |
| 0.05114792 | 0.0221772 | 0.0053118 | -5.262 |
| 0.00228881 | -0.0112764 | -0.0091100 | -7.580 |
| -0.04491138 | -0.0383430 | -0.0182484 | -9.655 |
| -0.08515724 | -0.0563264 | -0.0223433 | -9.715 |
| -0.11382845 | -0.0648467 | -0.0230569 | -5.529 |
| -0.12858392 | -0.0663450 | -0.0231652 | 2.589 |
| -0.13024810 | -0.0653405 | -0.0256034 | 12.995 |
| -0.12299130 | -0.0670035 | -0.0325201 | 26.070 |
| -0.11410655 | -0.0760104 | -0.0450526 | 38.664 |
| -0.11219078 | -0.0949691 | -0.0627491 | 46.900 |
| -0.12453051 | -0.1233016 | -0.0832563 | 50.689 |
| -0.15529963 | -0.1578002 | -0.1033007 | 51.753 |
| -0.20462442 | -0.1941590 | -0.1201270 | 50.439 |
| -0.26805501 | -0.2281567 | -0.1321392 | 46.175 |
| -0.33685870 | -0.2562523 | -0.1388034 | 40.575 |
| -0.39975845 | -0.2760465 | -0.1405562 | 34.133 |
| -0.44515405 | -0.2860397 | -0.1382762 | 26.776 |
| -0.46331843 | -0.2850001 | -0.1325917 | 19.422 |
| -0.44840161 | -0.2717108 | -0.1236255 | 13.444 |
| -0.39959536 | -0.2451461 | -0.1110530 | 8.022 |
| -0.32074152 | -0.2045763 | -0.0939752 | 2.719 |
| -0.21913218 | -0.1500485 | -0.0712217 | -1.196 |
| -0.10426066 | -0.0833439 | -0.0423184 | -2.808 |
| 0.01358704 | -0.0085504 | -0.0082735 | -3.236 |
| 0.12487823 | 0.0683132 | 0.0284160 | -2.595 |
| 0.22168519 | 0.1400326 | 0.0640335 | -1.255 |
| 0.29798698 | 0.1993021 | 0.0943082 | -0.005 |
| 0.34972040 | 0.2400693 | 0.1154382 | 0.042 |
| 0.37471129 | 0.2587156 | 0.1250789 | -0.717 |
| 0.37231196 | 0.2544385 | 0.1226669 | -1.427 |
| 0.34314515 | 0.2290084 | 0.1092604 | -2.362 |
| 0.28935609 | 0.1863619 | 0.0873179 | -3.856 |
| 0.21503947 | 0.1320007 | 0.0602862 | -6.230 |
| 0.12652004 | 0.0722770 | 0.0320087 | -9.502 |
| 0.03220657 | 0.0136476 | 0.0060435 | -13.269 |
| -0.05807718 | -0.0380017 | -0.0149092 | -17.510 |
| -0.13404923 | -0.0777177 | -0.0291496 | -22.669 |
| -0.18603798 | -0.1015237 | -0.0356943 | -28.965 |
| -0.20618921 | -0.1064554 | -0.0339610 | -35.236 |
| -0.18986495 | -0.0909539 | -0.0238483 | -39.660 |
| -0.13684760 | -0.0554740 | -0.0060643 | -40.715 |
| -0.05185173 | -0.0029099 | 0.0176898 | -38.461 |
| 0.05600536 | 0.0615634 | 0.0449898 | -33.770 |
| 0.17443771 | 0.1310563 | 0.0730871 | -26.592 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 0.52004170 | 0.3425894 | 0.1614600 | 0.0000319 | 0.0000071 | 58.635 |
| 0.04369420 | 0.1823360 | 0.1433437 | 0.0000321 | 0.0000042 | -0.759 |
| -0.38791671 | -0.0041808 | 0.0896005 | 0.0000318 | 0.0000013 | -79.846 |
| -0.69500798 | -0.1817317 | 0.0190048 | 0.0000380 | -0.0000001 | -154.144 |
| -0.82721823 | -0.3105288 | -0.0429262 | 0.0000346 | -0.0000015 | -182.287 |
| -0.77429361 | -0.3592000 | -0.0773815 | 0.0000294 | -0.0000018 | -209.730 |
| -0.55317089 | -0.3037740 | -0.0684940 | 0.0000556 | 0.0000027 | -210.649 |
| -0.20378635 | -0.1397820 | -0.0111461 | 0.0000679 | 0.0000070 | -169.751 |
| 0.21578335 | 0.1085304 | 0.0833740 | 0.0000855 | 0.0000124 | -103.830 |
| 0.64166337 | 0.3938592 | 0.1932644 | 0.0001032 | 0.0000179 | -38.426 |
| 1.01548041 | 0.6593513 | 0.2949042 | 0.0001195 | 0.0000227 | 30.278 |
| 1.28562521 | 0.8483871 | 0.3642518 | 0.0001147 | 0.0000242 | 104.684 |
| 1.40797378 | 0.9150101 | 0.3792997 | 0.0000924 | 0.0000220 | 154.027 |
| 1.35624170 | 0.8401224 | 0.3314214 | 0.0000692 | 0.0000182 | 144.565 |
| 1.13185987 | 0.6405033 | 0.2327946 | 0.0000467 | 0.0000130 | 116.081 |
| 0.75755591 | 0.3552274 | 0.1046317 | 0.0000030 | 0.0000044 | 80.572 |
| 0.27385452 | 0.0320388 | -0.0313175 | -0.0000354 | -0.0000041 | 39.754 |
| -0.26131300 | -0.2813135 | -0.1549006 | -0.0000685 | -0.0000119 | -16.742 |
| -0.77373841 | -0.5405647 | -0.2462779 | -0.0000786 | -0.0000166 | -85.969 |
| -1.18254848 | -0.7095675 | -0.2891712 | -0.0000731 | -0.0000183 | -136.730 |
| -1.41772678 | -0.7672088 | -0.2782805 | -0.0000578 | -0.0000173 | -182.465 |
| -1.42875957 | -0.7036365 | -0.2157290 | -0.0000133 | -0.0000113 | -223.346 |
| -1.19286303 | -0.5183886 | -0.1080591 | 0.0000404 | -0.0000024 | -239.987 |
| -0.72273212 | -0.2232116 | 0.0334855 | 0.0001000 | 0.0000086 | -247.395 |
| -0.06357621 | 0.1599121 | 0.1974883 | 0.0001700 | 0.0000220 | -227.491 |
| 0.70912902 | 0.5952759 | 0.3699037 | 0.0002231 | 0.0000340 | -178.364 |
| 1.49931265 | 1.0349189 | 0.5340731 | 0.0002705 | 0.0000452 | -127.547 |
| 2.20890711 | 1.4288709 | 0.6763610 | 0.0003128 | 0.0000550 | -81.186 |
| 2.75176908 | 1.7320862 | 0.7860314 | 0.0003376 | 0.0000615 | -36.944 |
| 3.06416917 | 1.9098577 | 0.8535663 | 0.0003486 | 0.0000645 | -24.600 |
| 3.11756478 | 1.9473801 | 0.8752424 | 0.0003572 | 0.0000653 | -34.181 |
| 2.91858502 | 1.8482949 | 0.8503241 | 0.0003415 | 0.0000616 | -44.950 |
| 2.50117989 | 1.6274191 | 0.7768351 | 0.0003056 | 0.0000540 | -57.409 |
| 1.92036725 | 1.3076143 | 0.6545610 | 0.0002546 | 0.0000436 | -73.843 |
| 1.24464109 | 0.9180655 | 0.4894614 | 0.0001900 | 0.0000308 | -87.059 |
| 0.54502297 | 0.4911434 | 0.2940840 | 0.0001139 | 0.0000166 | -92.791 |
| -0.11478090 | 0.0603511 | 0.0859423 | 0.0000344 | 0.0000023 | -92.483 |
| -0.68423215 | -0.3402312 | -0.1145023 | -0.0000397 | -0.0000108 | -89.822 |
| -1.12834711 | -0.6773808 | -0.2867274 | -0.0001015 | -0.0000215 | -80.010 |
| -1.42880772 | -0.9234818 | -0.4147492 | -0.0001498 | -0.0000293 | -62.863 |
| -1.58195749 | -1.0611140 | -0.4896538 | -0.0001786 | -0.0000337 | -42.112 |
| -1.59495496 | -1.0858912 | -0.5097015 | -0.0001881 | -0.0000346 | -16.997 |
| -1.48479702 | -1.0094698 | -0.4815363 | -0.0001868 | -0.0000332 | 35.134 |
| -1.28181056 | -0.8627977 | -0.4231392 | -0.0001887 | -0.0000314 | 95.430 |
| -1.02307242 | -0.6854365 | -0.3548790 | -0.0001741 | -0.0000276 | 121.988 |
| -0.74103754 | -0.5084533 | -0.2870205 | -0.0001436 | -0.0000219 | 130.025 |
| -0.46402965 | -0.3507421 | -0.2222309 | -0.0001179 | -0.0000169 | 120.823 |
| -0.21587560 | -0.2186892 | -0.1597437 | -0.0000843 | -0.0000114 | 105.168 |
| -0.01504775 | -0.1100992 | -0.0994662 | -0.0000566 | -0.0000068 | 83.130 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 0.12833526 | -0.0187295 | -0.0425139 | -0.0000266 | -0.0000024 | 60.052 |
| 0.21338338 | 0.0599134 | 0.0086095 | -0.0000040 | 0.0000010 | 44.621 |
| 0.24581360 | 0.1235021 | 0.0491512 | 0.0000091 | 0.0000029 | 43.998 |
| 0.23353728 | 0.1616488 | 0.0719377 | 0.0000092 | 0.0000031 | 55.854 |
| 0.18339555 | 0.1601958 | 0.0696218 | -0.0000017 | 0.0000015 | 73.090 |
| 0.09929739 | 0.1080111 | 0.0377339 | -0.0000229 | -0.0000018 | 92.637 |
| -0.01892736 | 0.0018425 | -0.0238538 | -0.0000545 | -0.0000067 | 110.987 |
| -0.17439729 | -0.1517308 | -0.1103851 | -0.0000924 | -0.0000127 | 125.291 |
| -0.36984623 | -0.3375332 | -0.2125625 | -0.0001336 | -0.0000195 | 133.984 |
| -0.60352329 | -0.5355909 | -0.3181133 | -0.0001737 | -0.0000264 | 138.813 |
| -0.86587686 | -0.7257494 | -0.4143239 | -0.0002092 | -0.0000327 | 134.968 |
| -1.13685496 | -0.8899058 | -0.4895307 | -0.0002324 | -0.0000374 | 122.783 |
| -1.38745460 | -1.0139044 | -0.5357137 | -0.0002453 | -0.0000405 | 112.721 |
| -1.58627547 | -1.0901178 | -0.5519848 | -0.0002510 | -0.0000422 | 106.939 |
| -1.70571206 | -1.1170100 | -0.5439133 | -0.0002470 | -0.0000422 | 101.328 |
| -1.72621215 | -1.0963250 | -0.5191426 | -0.0002345 | -0.0000404 | 93.144 |
| -1.63932243 | -1.0306318 | -0.4830170 | -0.0002144 | -0.0000371 | 81.019 |
| -1.44924315 | -0.9223051 | -0.4365075 | -0.0001877 | -0.0000325 | 69.372 |
| -1.17315357 | -0.7747061 | -0.3776749 | -0.0001577 | -0.0000269 | 61.394 |
| -0.83890974 | -0.5937704 | -0.3044695 | -0.0001237 | -0.0000204 | 57.149 |
| -0.48018523 | -0.3888722 | -0.2170116 | -0.0000865 | -0.0000134 | 55.232 |
| -0.13055039 | -0.1727698 | -0.1186624 | -0.0000469 | -0.0000062 | 51.485 |
| 0.18234890 | 0.0398898 | -0.0153565 | -0.0000050 | 0.0000011 | 41.456 |
| 0.44083368 | 0.2349392 | 0.0859590 | 0.0000374 | 0.0000081 | 24.389 |
| 0.63813654 | 0.4007845 | 0.1785184 | 0.0000774 | 0.0000144 | 0.851 |
| 0.77717029 | 0.5303763 | 0.2569304 | 0.0001140 | 0.0000198 | -30.789 |
| 0.86775651 | 0.6223479 | 0.3180580 | 0.0001453 | 0.0000242 | -56.719 |
| 0.92066265 | 0.6783409 | 0.3591442 | 0.0001630 | 0.0000267 | -76.993 |
| 0.94526011 | 0.7025209 | 0.3791118 | 0.0001757 | 0.0000284 | -98.610 |
| 0.95018981 | 0.7025359 | 0.3812580 | 0.0001837 | 0.0000292 | -119.720 |
| 0.94330518 | 0.6885172 | 0.3729016 | 0.0001880 | 0.0000295 | -142.950 |
| 0.93218779 | 0.6718982 | 0.3635544 | 0.0001935 | 0.0000300 | -160.578 |
| 0.92261875 | 0.6619134 | 0.3603676 | 0.0001949 | 0.0000301 | -166.372 |
| 0.91752819 | 0.6628170 | 0.3650926 | 0.0001957 | 0.0000302 | -167.201 |
| 0.91840298 | 0.6743741 | 0.3753984 | 0.0001982 | 0.0000306 | -160.156 |
| 0.92446623 | 0.6913976 | 0.3857470 | 0.0001951 | 0.0000304 | -144.027 |
| 0.93134811 | 0.7041394 | 0.3888017 | 0.0001873 | 0.0000296 | -119.915 |
| 0.93081772 | 0.7006238 | 0.3777897 | 0.0001725 | 0.0000279 | -95.027 |
| 0.91231972 | 0.6706841 | 0.3492814 | 0.0001537 | 0.0000253 | -70.301 |
| 0.86462816 | 0.6088409 | 0.3039058 | 0.0001292 | 0.0000218 | -53.914 |
| 0.78011966 | 0.5176705 | 0.2473955 | 0.0001082 | 0.0000184 | -55.362 |
| 0.65938036 | 0.4092693 | 0.1902874 | 0.0000929 | 0.0000154 | -65.982 |
| 0.51123359 | 0.3007304 | 0.1430511 | 0.0000794 | 0.0000125 | -79.118 |
| 0.35124782 | 0.2083181 | 0.1118800 | 0.0000712 | 0.0000105 | -88.618 |
| 0.19933747 | 0.1428429 | 0.0972197 | 0.0000659 | 0.0000089 | -95.881 |
| 0.07727328 | 0.1084023 | 0.0957225 | 0.0000662 | 0.0000084 | -100.131 |
| 0.00461332 | 0.1030539 | 0.1026434 | 0.0000683 | 0.0000085 | -101.456 |
| -0.00544104 | 0.1214547 | 0.1140671 | 0.0000735 | 0.0000092 | -104.558 |
| 0.05173773 | 0.1589460 | 0.1289414 | 0.0000833 | 0.0000109 | -109.938 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 0.17098808 | 0.2136356 | 0.1488033 | 0.0000955 | 0.0000132 | -113.561 |
| 0.33728854 | 0.2852403 | 0.1754583 | 0.0001084 | 0.0000159 | -111.334 |
| 0.52782079 | 0.3721334 | 0.2087669 | 0.0001205 | 0.0000187 | -102.188 |
| 0.71590068 | 0.4684397 | 0.2457746 | 0.0001304 | 0.0000211 | -84.228 |
| 0.87432457 | 0.5615382 | 0.2801073 | 0.0001330 | 0.0000226 | -51.037 |
| 0.97669780 | 0.6307729 | 0.3012482 | 0.0001225 | 0.0000221 | -5.166 |
| 0.99929661 | 0.6506394 | 0.2965026 | 0.0000990 | 0.0000194 | 47.227 |
| 0.92274746 | 0.5966968 | 0.2542236 | 0.0000593 | 0.0000139 | 104.188 |
| 0.73203678 | 0.4504933 | 0.1656892 | -0.0000001 | 0.0000051 | 166.911 |
| 0.41648813 | 0.2028053 | 0.0262805 | -0.0000793 | -0.0000071 | 225.755 |
| -0.02517439 | -0.1411342 | -0.1600030 | -0.0001654 | -0.0000212 | 247.804 |
| -0.57429088 | -0.5541624 | -0.3736336 | -0.0002392 | -0.0000348 | 232.200 |
| -1.19026388 | -0.9904982 | -0.5839413 | -0.0003060 | -0.0000477 | 201.922 |
| -1.81698834 | -1.3980046 | -0.7615527 | -0.0003607 | -0.0000589 | 164.814 |
| -2.38855263 | -1.7280876 | -0.8858282 | -0.0003927 | -0.0000666 | 123.156 |
| -2.83600657 | -1.9429520 | -0.9470038 | -0.0004023 | -0.0000703 | 90.802 |
| -3.09912014 | -2.0229000 | -0.9472644 | -0.0003962 | -0.0000706 | 76.986 |
| -3.13869397 | -1.9695567 | -0.8987208 | -0.0003776 | -0.0000677 | 85.476 |
| -2.94717691 | -1.8049191 | -0.8198354 | -0.0003565 | -0.0000630 | 131.485 |
| -2.55620390 | -1.5683037 | -0.7327855 | -0.0003438 | -0.0000581 | 190.393 |
| -2.02883126 | -1.3026699 | -0.6533403 | -0.0003214 | -0.0000517 | 230.580 |
| -1.44381185 | -1.0403924 | -0.5831755 | -0.0002924 | -0.0000445 | 255.511 |
| -0.88319053 | -0.8004659 | -0.5147086 | -0.0002634 | -0.0000377 | 261.878 |
| -0.41758682 | -0.5895556 | -0.4378573 | -0.0002239 | -0.0000302 | 244.906 |
| -0.09214677 | -0.4054598 | -0.3453027 | -0.0001767 | -0.0000226 | 211.618 |
| 0.08042829 | -0.2437701 | -0.2370298 | -0.0001252 | -0.0000152 | 165.654 |
| 0.11926283 | -0.1034041 | -0.1214579 | -0.0000727 | -0.0000083 | 125.185 |
| 0.06520739 | 0.0092274 | -0.0149938 | -0.0000323 | -0.0000032 | 87.280 |
| -0.02954144 | 0.0849962 | 0.0656059 | 0.0000049 | 0.0000010 | 38.859 |
| -0.11153798 | 0.1212953 | 0.1123869 | 0.0000363 | 0.0000045 | -9.391 |
| -0.14014775 | 0.1247648 | 0.1268277 | 0.0000531 | 0.0000064 | -44.769 |
| -0.09773347 | 0.1095642 | 0.1165916 | 0.0000590 | 0.0000072 | -68.133 |
| 0.00968651 | 0.0943699 | 0.0934136 | 0.0000589 | 0.0000076 | -74.520 |
| 0.15700139 | 0.0955375 | 0.0693491 | 0.0000512 | 0.0000073 | -62.807 |
| 0.30870202 | 0.1203601 | 0.0533854 | 0.0000414 | 0.0000069 | -38.340 |
| 0.42964867 | 0.1643560 | 0.0499383 | 0.0000322 | 0.0000066 | -10.007 |
| 0.49514762 | 0.2142445 | 0.0594400 | 0.0000290 | 0.0000067 | 2.129 |
| 0.49983131 | 0.2573347 | 0.0820188 | 0.0000417 | 0.0000083 | -18.027 |
| 0.46068852 | 0.2906569 | 0.1197954 | 0.0000703 | 0.0000116 | -62.246 |
| 0.40997177 | 0.3217743 | 0.1734338 | 0.0001053 | 0.0000156 | -109.712 |
| 0.38489925 | 0.3647912 | 0.2394979 | 0.0001459 | 0.0000206 | -179.476 |
| 0.42566187 | 0.4415913 | 0.3178817 | 0.0002082 | 0.0000286 | -263.877 |
| 0.56688068 | 0.5740103 | 0.4116410 | 0.0002672 | 0.0000370 | -307.637 |
| 0.82107579 | 0.7671832 | 0.5169512 | 0.0003086 | 0.0000443 | -330.376 |
| 1.17942753 | 1.0108737 | 0.6277800 | 0.0003614 | 0.0000534 | -338.111 |
| 1.61329527 | 1.2826134 | 0.7377336 | 0.0003979 | 0.0000612 | -304.356 |
| 2.07107774 | 1.5462540 | 0.8341022 | 0.0004121 | 0.0000662 | -247.357 |
| 2.48662871 | 1.7605555 | 0.9012499 | 0.0004170 | 0.0000695 | -182.093 |
| 2.78974099 | 1.8871727 | 0.9244268 | 0.0003971 | 0.0000689 | -95.657 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 2.91360307 | 1.8929826 | 0.8897907 | 0.0003485 | 0.0000634 | -27.238 |
| 2.81062970 | 1.7593951 | 0.7924258 | 0.0002929 | 0.0000551 | 36.631 |
| 2.45758293 | 1.4813967 | 0.6341733 | 0.0002021 | 0.0000410 | 90.209 |
| 1.86051534 | 1.0684949 | 0.4232083 | 0.0001060 | 0.0000244 | 114.822 |
| 1.05868254 | 0.5475519 | 0.1754743 | 0.0000040 | 0.0000059 | 126.870 |
| 0.11842050 | -0.0415817 | -0.0901775 | -0.0001042 | -0.0000142 | 114.297 |
| -0.87182312 | -0.6471954 | -0.3518619 | -0.0001933 | -0.0000321 | 81.463 |
| -1.81209230 | -1.2113630 | -0.5870501 | -0.0002721 | -0.0000481 | 49.478 |
| -2.60679131 | -1.6805189 | -0.7779750 | -0.0003352 | -0.0000610 | 22.864 |
| -3.17677433 | -2.0123634 | -0.9124124 | -0.0003747 | -0.0000692 | 4.785 |
| -3.46821346 | -2.1799282 | -0.9825598 | -0.0003911 | -0.0000726 | -4.831 |
| -3.45836858 | -2.1733667 | -0.9843246 | -0.0003818 | -0.0000707 | 0.322 |
| -3.15929603 | -2.0012777 | -0.9191835 | -0.0003540 | -0.0000646 | 24.002 |
| -2.61639499 | -1.6893124 | -0.7953743 | -0.0003080 | -0.0000548 | 52.256 |
| -1.89931732 | -1.2740511 | -0.6252761 | -0.0002428 | -0.0000415 | 81.858 |
| -1.09160719 | -0.7982101 | -0.4241997 | -0.0001692 | -0.0000267 | 104.950 |
| -0.27895354 | -0.3059449 | -0.2088751 | -0.0000879 | -0.0000112 | 120.366 |
| 0.46080315 | 0.1602461 | 0.0031026 | -0.0000104 | 0.0000034 | 127.722 |
| 1.06523378 | 0.5619858 | 0.1939161 | 0.0000588 | 0.0000159 | 128.468 |
| 1.49182716 | 0.8673531 | 0.3467194 | 0.0001121 | 0.0000252 | 122.173 |
| 1.71973203 | 1.0536316 | 0.4477649 | 0.0001464 | 0.0000307 | 110.713 |
| 1.74786844 | 1.1089260 | 0.4878395 | 0.0001563 | 0.0000318 | 103.156 |
| 1.58917078 | 1.0310863 | 0.4616989 | 0.0001362 | 0.0000279 | 108.225 |
| 1.26445768 | 0.8259950 | 0.3678066 | 0.0000866 | 0.0000192 | 122.423 |
| 0.79995109 | 0.5081602 | 0.2108487 | 0.0000150 | 0.0000068 | 137.943 |
| 0.22745780 | 0.1020846 | 0.0043806 | -0.0000708 | -0.0000081 | 146.439 |
| -0.41402916 | -0.3569076 | -0.2285932 | -0.0001581 | -0.0000238 | 137.443 |
| -1.07625756 | -0.8230829 | -0.4576777 | -0.0002339 | -0.0000380 | 111.714 |
| -1.70301418 | -1.2452023 | -0.6516130 | -0.0002926 | -0.0000497 | 79.132 |
| -2.23462764 | -1.5746847 | -0.7860601 | -0.0003281 | -0.0000576 | 40.469 |
| -2.61234968 | -1.7721911 | -0.8469392 | -0.0003332 | -0.0000604 | 2.037 |
| -2.78529752 | -1.8137776 | -0.8313703 | -0.0003128 | -0.0000583 | -28.640 |
| -2.71826465 | -1.6941413 | -0.7458343 | -0.0002668 | -0.0000514 | -59.784 |
| -2.39704559 | -1.4242710 | -0.6011471 | -0.0001962 | -0.0000397 | -76.958 |
| -1.83577597 | -1.0302343 | -0.4117694 | -0.0001175 | -0.0000255 | -86.451 |
| -1.07706623 | -0.5469682 | -0.1926141 | -0.0000229 | -0.0000083 | -93.872 |
| -0.18717485 | -0.0120298 | 0.0431262 | 0.0000751 | 0.0000100 | -96.773 |
| 0.75127402 | 0.5370765 | 0.2830863 | 0.0001718 | 0.0000282 | -97.935 |
| 1.65025777 | 1.0643068 | 0.5150139 | 0.0002633 | 0.0000454 | -96.711 |
| 2.42765080 | 1.5348303 | 0.7257436 | 0.0003410 | 0.0000600 | -92.107 |
| 3.01675891 | 1.9147479 | 0.9006577 | 0.0004003 | 0.0000711 | -83.749 |
| 3.37275861 | 2.1724475 | 1.0243927 | 0.0004353 | 0.0000776 | -73.622 |
| 3.47550474 | 2.2822237 | 1.0829821 | 0.0004435 | 0.0000790 | -63.200 |
| 3.32878087 | 2.2292193 | 1.0667761 | 0.0004234 | 0.0000752 | -59.274 |
| 2.95782820 | 2.0148684 | 0.9740705 | 0.0003792 | 0.0000667 | -62.115 |
| 2.40427530 | 1.6588349 | 0.8123694 | 0.0003116 | 0.0000541 | -68.901 |
| 1.72028581 | 1.1969325 | 0.5974591 | 0.0002274 | 0.0000385 | -77.963 |
| 0.96404108 | 0.6764514 | 0.3516386 | 0.0001351 | 0.0000216 | -89.529 |
| 0.19668069 | 0.1500278 | 0.1012815 | 0.0000447 | 0.0000049 | -101.454 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| -0.52087761 | -0.3314623 | -0.1270067 | -0.0000363 | -0.0000101 | -110.894 |
| -1.13165761 | -0.7252969 | -0.3106909 | -0.0001002 | -0.0000220 | -116.409 |
| -1.58696667 | -1.0013504 | -0.4348133 | -0.0001431 | -0.0000299 | -113.178 |
| -1.85193420 | -1.1450045 | -0.4944812 | -0.0001656 | -0.0000339 | -99.925 |
| -1.91000144 | -1.1571441 | -0.4943374 | -0.0001674 | -0.0000339 | -80.555 |
| -1.76563321 | -1.0519541 | -0.4456693 | -0.0001529 | -0.0000305 | -47.471 |
| -1.44672802 | -0.8554923 | -0.3644450 | -0.0001321 | -0.0000253 | -9.409 |
| -1.00093653 | -0.6004057 | -0.2663776 | -0.0001008 | -0.0000181 | 26.281 |
| -0.48895931 | -0.3204720 | -0.1634169 | -0.0000678 | -0.0000105 | 59.386 |
| 0.02251144 | -0.0476179 | -0.0641512 | -0.0000367 | -0.0000033 | 90.028 |
| 0.46908102 | 0.1901487 | 0.0245254 | -0.0000100 | 0.0000028 | 111.889 |
| 0.79866000 | 0.3717015 | 0.0973767 | 0.0000140 | 0.0000077 | 117.240 |
| 0.97998270 | 0.4851358 | 0.1513683 | 0.0000348 | 0.0000112 | 109.018 |
| 1.00532448 | 0.5267664 | 0.1842237 | 0.0000471 | 0.0000126 | 94.286 |
| 0.88823819 | 0.4986346 | 0.1928823 | 0.0000494 | 0.0000120 | 76.840 |
| 0.65879621 | 0.4071485 | 0.1741725 | 0.0000415 | 0.0000094 | 57.933 |
| 0.35700456 | 0.2626744 | 0.1267778 | 0.0000232 | 0.0000051 | 43.839 |
| 0.02430596 | 0.0783374 | 0.0520924 | -0.0000074 | -0.0000010 | 37.402 |
| -0.30320701 | -0.1303556 | -0.0447787 | -0.0000452 | -0.0000080 | 33.119 |
| -0.59763479 | -0.3446026 | -0.1536057 | -0.0000839 | -0.0000149 | 30.551 |
| -0.84047472 | -0.5433888 | -0.2603500 | -0.0001213 | -0.0000213 | 30.239 |
| -1.02187636 | -0.7061102 | -0.3502387 | -0.0001513 | -0.0000263 | 30.439 |
| -1.13795878 | -0.8154897 | -0.4108207 | -0.0001700 | -0.0000294 | 32.268 |
| -1.18839911 | -0.8609910 | -0.4349755 | -0.0001772 | -0.0000305 | 37.633 |
| -1.17485156 | -0.8412224 | -0.4225145 | -0.0001726 | -0.0000296 | 43.327 |
| -1.09971333 | -0.7634607 | -0.3790413 | -0.0001562 | -0.0000267 | 48.409 |
| -0.96665844 | -0.6415462 | -0.3138710 | -0.0001323 | -0.0000226 | 51.380 |
| -0.78191323 | -0.4922587 | -0.2372875 | -0.0001023 | -0.0000173 | 48.149 |
| -0.55509892 | -0.3310014 | -0.1576956 | -0.0000682 | -0.0000115 | 40.670 |
| -0.30015792 | -0.1693801 | -0.0806121 | -0.0000341 | -0.0000055 | 27.400 |
| -0.03392194 | -0.0135483 | -0.0078176 | 0.0000025 | 0.0000007 | 4.649 |
| 0.22700289 | 0.1359416 | 0.0626817 | 0.0000408 | 0.0000070 | -20.440 |
| 0.46780532 | 0.2807129 | 0.1337042 | 0.0000766 | 0.0000129 | -44.746 |
| 0.67730676 | 0.4212810 | 0.2064517 | 0.0001119 | 0.0000186 | -65.670 |
| 0.84918489 | 0.5549331 | 0.2792164 | 0.0001435 | 0.0000237 | -82.176 |
| 0.98203016 | 0.6753965 | 0.3474609 | 0.0001714 | 0.0000281 | -94.722 |
| 1.07821682 | 0.7743006 | 0.4050817 | 0.0001934 | 0.0000316 | -103.854 |
| 1.14186964 | 0.8436125 | 0.4461668 | 0.0002084 | 0.0000339 | -110.967 |
| 1.17696826 | 0.8783349 | 0.4669056 | 0.0002164 | 0.0000350 | -118.248 |
| 1.18619011 | 0.8783647 | 0.4669242 | 0.0002175 | 0.0000351 | -123.605 |
| 1.17010934 | 0.8481235 | 0.4489387 | 0.0002110 | 0.0000340 | -126.996 |
| 1.12807594 | 0.7953226 | 0.4180678 | 0.0002005 | 0.0000322 | -130.073 |
| 1.06020148 | 0.7292668 | 0.3808554 | 0.0001873 | 0.0000300 | -130.157 |
| 0.96832662 | 0.6580456 | 0.3430075 | 0.0001712 | 0.0000273 | -124.179 |
| 0.85615966 | 0.5861854 | 0.3073318 | 0.0001530 | 0.0000243 | -112.837 |
| 0.72945527 | 0.5144519 | 0.2735872 | 0.0001342 | 0.0000212 | -99.937 |
| 0.59634895 | 0.4419153 | 0.2402858 | 0.0001171 | 0.0000182 | -92.992 |
| 0.46755462 | 0.3691940 | 0.2072586 | 0.0001041 | 0.0000158 | -91.203 |
| 0.35429373 | 0.2994888 | 0.1758760 | 0.0000921 | 0.0000136 | -91.000 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 0.26553476 | 0.2378005 | 0.1479654 | 0.0000820 | 0.0000117 | -90.127 |
| 0.20635936 | 0.1895505 | 0.1250915 | 0.0000734 | 0.0000103 | -87.608 |
| 0.17764426 | 0.1590043 | 0.1083842 | 0.0000668 | 0.0000093 | -82.527 |
| 0.17657285 | 0.1478374 | 0.0985039 | 0.0000620 | 0.0000087 | -75.811 |
| 0.19780982 | 0.1546394 | 0.0957361 | 0.0000598 | 0.0000087 | -67.716 |
| 0.23438151 | 0.1750211 | 0.0995580 | 0.0000587 | 0.0000088 | -56.524 |
| 0.27804198 | 0.2021587 | 0.1078914 | 0.0000578 | 0.0000091 | -45.051 |
| 0.32062324 | 0.2288641 | 0.1177992 | 0.0000588 | 0.0000095 | -38.148 |
| 0.35558213 | 0.2498183 | 0.1267565 | 0.0000609 | 0.0000100 | -32.581 |
| 0.37764670 | 0.2614466 | 0.1322994 | 0.0000601 | 0.0000101 | -26.469 |
| 0.38245426 | 0.2612539 | 0.1319139 | 0.0000570 | 0.0000097 | -19.510 |
| 0.36674010 | 0.2474472 | 0.1236073 | 0.0000504 | 0.0000087 | -12.040 |
| 0.32861854 | 0.2187834 | 0.1064782 | 0.0000403 | 0.0000072 | -3.233 |
| 0.26736625 | 0.1743219 | 0.0805588 | 0.0000259 | 0.0000049 | 8.658 |
| 0.18292566 | 0.1132856 | 0.0462003 | 0.0000071 | 0.0000020 | 22.394 |
| 0.07602651 | 0.0356795 | 0.0040187 | -0.0000146 | -0.0000014 | 37.119 |
| -0.05160721 | -0.0571783 | -0.0450588 | -0.0000392 | -0.0000054 | 52.071 |
| -0.19708327 | -0.1625213 | -0.0997352 | -0.0000655 | -0.0000097 | 66.897 |
| -0.35628904 | -0.2764542 | -0.1583452 | -0.0000932 | -0.0000142 | 81.745 |
| -0.52397506 | -0.3945195 | -0.2189188 | -0.0001214 | -0.0000189 | 95.679 |
| -0.69367722 | -0.5119423 | -0.2790269 | -0.0001483 | -0.0000234 | 107.111 |
| -0.85756947 | -0.6234725 | -0.3355639 | -0.0001721 | -0.0000274 | 114.229 |
| -1.00631459 | -0.7229215 | -0.3846023 | -0.0001904 | -0.0000307 | 114.020 |
| -1.12911068 | -0.8027904 | -0.4215276 | -0.0002011 | -0.0000328 | 109.711 |
| -1.21531711 | -0.8556099 | -0.4426124 | -0.0002061 | -0.0000340 | 104.270 |
| -1.25608067 | -0.8755011 | -0.4461284 | -0.0002038 | -0.0000339 | 96.171 |
| -1.24491973 | -0.8587850 | -0.4319101 | -0.0001934 | -0.0000324 | 87.301 |
| -1.17882780 | -0.8049391 | -0.4011706 | -0.0001776 | -0.0000298 | 79.342 |
| -1.05968237 | -0.7175015 | -0.3566508 | -0.0001577 | -0.0000264 | 78.110 |
| -0.89607654 | -0.6050623 | -0.3033851 | -0.0001387 | -0.0000228 | 83.648 |
| -0.70316972 | -0.4801964 | -0.2478947 | -0.0001197 | -0.0000190 | 91.849 |
| -0.50073109 | -0.3569084 | -0.1963890 | -0.0001028 | -0.0000155 | 102.670 |
| -0.31111443 | -0.2487144 | -0.1540002 | -0.0000906 | -0.0000127 | 112.961 |
| -0.15612382 | -0.1665382 | -0.1239947 | -0.0000817 | -0.0000107 | 119.961 |
| -0.05351951 | -0.1170972 | -0.1073766 | -0.0000769 | -0.0000096 | 121.564 |
| -0.01383106 | -0.1020626 | -0.1029569 | -0.0000746 | -0.0000092 | 115.289 |
| -0.03787526 | -0.1178004 | -0.1075828 | -0.0000729 | -0.0000094 | 100.569 |
| -0.11589405 | -0.1559840 | -0.1167835 | -0.0000706 | -0.0000098 | 77.844 |
| -0.22876788 | -0.2050773 | -0.1257961 | -0.0000666 | -0.0000101 | 53.094 |
| -0.35187475 | -0.2530903 | -0.1312765 | -0.0000627 | -0.0000104 | 29.741 |
| -0.45943330 | -0.2896004 | -0.1317400 | -0.0000569 | -0.0000103 | 8.699 |
| -0.52838088 | -0.3065393 | -0.1266415 | -0.0000490 | -0.0000097 | -9.841 |
| -0.54164589 | -0.2982888 | -0.1152254 | -0.0000385 | -0.0000084 | -25.547 |
| -0.49069620 | -0.2617608 | -0.0961794 | -0.0000255 | -0.0000063 | -35.006 |
| -0.37682667 | -0.1966167 | -0.0681559 | -0.0000103 | -0.0000036 | -45.316 |
| -0.20893270 | -0.1037275 | -0.0290407 | 0.0000122 | 0.0000003 | -54.665 |
| -0.00152751 | 0.0145089 | 0.0227752 | 0.0000368 | 0.0000048 | -63.225 |
| 0.22781290 | 0.1534604 | 0.0870001 | 0.0000661 | 0.0000100 | -69.357 |
| 0.46089942 | 0.3054850 | 0.1604738 | 0.0000959 | 0.0000153 | -74.241 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 0.68135935 | 0.4601972 | 0.2375762 | 0.0001265 | 0.0000206 | -78.316 |
| 0.87618339 | 0.6055752 | 0.3113966 | 0.0001547 | 0.0000255 | -83.957 |
| 1.03657919 | 0.7301107 | 0.3754920 | 0.0001800 | 0.0000297 | -91.722 |
| 1.15760350 | 0.8248124 | 0.4250332 | 0.0001998 | 0.0000329 | -100.090 |
| 1.23698239 | 0.8844194 | 0.4571089 | 0.0002128 | 0.0000350 | -108.853 |
| 1.27438555 | 0.9081075 | 0.4709846 | 0.0002195 | 0.0000359 | -117.872 |
| 1.27123961 | 0.8992855 | 0.4681383 | 0.0002201 | 0.0000358 | -126.211 |
| 1.23092668 | 0.8644903 | 0.4519213 | 0.0002157 | 0.0000349 | -135.145 |
| 1.15950511 | 0.8122016 | 0.4272048 | 0.0002089 | 0.0000334 | -143.352 |
| 1.06564971 | 0.7511159 | 0.3991739 | 0.0001998 | 0.0000316 | -149.188 |
| 0.95989791 | 0.6886234 | 0.3719475 | 0.0001900 | 0.0000296 | -152.240 |
| 0.85356077 | 0.6300908 | 0.3478299 | 0.0001803 | 0.0000277 | -152.003 |
| 0.75732867 | 0.5788063 | 0.3272974 | 0.0001711 | 0.0000260 | -150.378 |
| 0.67979833 | 0.5363398 | 0.3095947 | 0.0001625 | 0.0000245 | -141.906 |
| 0.62449100 | 0.5013348 | 0.2920647 | 0.0001492 | 0.0000226 | -122.663 |
| 0.58832680 | 0.4692563 | 0.2706649 | 0.0001329 | 0.0000204 | -103.580 |
| 0.56445923 | 0.4357477 | 0.2436573 | 0.0001191 | 0.0000185 | -88.924 |
| 0.54478063 | 0.3987713 | 0.2129947 | 0.0001049 | 0.0000166 | -77.591 |
| 0.52146117 | 0.3588398 | 0.1828872 | 0.0000924 | 0.0000148 | -71.506 |
| 0.48916306 | 0.3190874 | 0.1581669 | 0.0000840 | 0.0000134 | -70.381 |
| 0.44659097 | 0.2842598 | 0.1424534 | 0.0000790 | 0.0000124 | -71.411 |
| 0.39655825 | 0.2585564 | 0.1365308 | 0.0000766 | 0.0000118 | -71.264 |
| 0.34449595 | 0.2431504 | 0.1375716 | 0.0000741 | 0.0000113 | -63.295 |
| 0.29526426 | 0.2339202 | 0.1390370 | 0.0000668 | 0.0000103 | -46.017 |
| 0.25046431 | 0.2216516 | 0.1325410 | 0.0000542 | 0.0000086 | -20.710 |
| 0.20688251 | 0.1945833 | 0.1107113 | 0.0000345 | 0.0000059 | 7.848 |
| 0.15617693 | 0.1419690 | 0.0694808 | 0.0000078 | 0.0000022 | 42.875 |
| 0.08473179 | 0.0559787 | 0.0078283 | -0.0000291 | -0.0000029 | 77.540 |
| -0.02237473 | -0.0651821 | -0.0712043 | -0.0000670 | -0.0000086 | 100.289 |
| -0.17507128 | -0.2147533 | -0.1595229 | -0.0001029 | -0.0000144 | 113.110 |
| -0.37485251 | -0.3796021 | -0.2468130 | -0.0001376 | -0.0000203 | 118.271 |
| -0.61329802 | -0.5443413 | -0.3241766 | -0.0001674 | -0.0000257 | 122.152 |
| -0.87283359 | -0.6956376 | -0.3868791 | -0.0001937 | -0.0000306 | 121.328 |
| -1.12776547 | -0.8233024 | -0.4334833 | -0.0002103 | -0.0000343 | 115.666 |
| -1.34813772 | -0.9204712 | -0.4645613 | -0.0002211 | -0.0000368 | 110.610 |
| -1.50629785 | -0.9838767 | -0.4823146 | -0.0002273 | -0.0000384 | 107.061 |
| -1.58251547 | -1.0126421 | -0.4892794 | -0.0002282 | -0.0000388 | 105.113 |
| -1.56854104 | -1.0067353 | -0.4868557 | -0.0002246 | -0.0000381 | 103.126 |
| -1.46839384 | -0.9659666 | -0.4743248 | -0.0002152 | -0.0000362 | 101.170 |
| -1.29686396 | -0.8904133 | -0.4492510 | -0.0002007 | -0.0000333 | 98.972 |
| -1.07597094 | -0.7816656 | -0.4088077 | -0.0001802 | -0.0000293 | 96.477 |
| -0.83045803 | -0.6442535 | -0.3515534 | -0.0001544 | -0.0000244 | 93.843 |
| -0.58358908 | -0.4865916 | -0.2790325 | -0.0001244 | -0.0000190 | 91.279 |
| -0.35416384 | -0.3208626 | -0.1964988 | -0.0000924 | -0.0000134 | 88.101 |
| -0.15500594 | -0.1614803 | -0.1122017 | -0.0000606 | -0.0000080 | 82.659 |
| 0.00715024 | -0.0224368 | -0.0353884 | -0.0000312 | -0.0000032 | 73.651 |
| 0.13060853 | 0.0855512 | 0.0261207 | -0.0000063 | 0.0000007 | 60.132 |
| 0.21703399 | 0.1571511 | 0.0678596 | 0.0000130 | 0.0000036 | 44.450 |
| 0.26927100 | 0.1926154 | 0.0890540 | 0.0000245 | 0.0000052 | 30.229 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 0.29005469 | 0.1968163 | 0.0921557 | 0.0000296 | 0.0000058 | 13.170 |
| 0.28331748 | 0.1789453 | 0.0831420 | 0.0000334 | 0.0000060 | -5.866 |
| 0.25502503 | 0.1505878 | 0.0699765 | 0.0000348 | 0.0000058 | -23.393 |
| 0.21310079 | 0.1228073 | 0.0598701 | 0.0000363 | 0.0000056 | -38.112 |
| 0.16731778 | 0.1041307 | 0.0574553 | 0.0000393 | 0.0000057 | -50.752 |
| 0.12891392 | 0.0998358 | 0.0643951 | 0.0000453 | 0.0000063 | -61.478 |
| 0.10907334 | 0.1117902 | 0.0796511 | 0.0000530 | 0.0000072 | -67.564 |
| 0.11618684 | 0.1383182 | 0.0998390 | 0.0000604 | 0.0000083 | -68.754 |
| 0.15382686 | 0.1752077 | 0.1206664 | 0.0000678 | 0.0000096 | -68.683 |
| 0.22031973 | 0.2177898 | 0.1391143 | 0.0000754 | 0.0000111 | -67.945 |
| 0.30878252 | 0.2621485 | 0.1542502 | 0.0000818 | 0.0000124 | -66.202 |
| 0.40806371 | 0.3054776 | 0.1668376 | 0.0000873 | 0.0000137 | -64.597 |
| 0.50493741 | 0.3460573 | 0.1785377 | 0.0000926 | 0.0000150 | -62.274 |
| 0.58634834 | 0.3823127 | 0.1904902 | 0.0000963 | 0.0000159 | -57.535 |
| 0.64140939 | 0.4116799 | 0.2021490 | 0.0000983 | 0.0000165 | -52.383 |
| 0.66356303 | 0.4307189 | 0.2116254 | 0.0000996 | 0.0000168 | -48.934 |
| 0.65163760 | 0.4358500 | 0.2165353 | 0.0000991 | 0.0000166 | -45.723 |
| 0.60898962 | 0.4239106 | 0.2143629 | 0.0000953 | 0.0000159 | -43.811 |
| 0.54213915 | 0.3933137 | 0.2032429 | 0.0000891 | 0.0000147 | -42.065 |
| 0.45862008 | 0.3445518 | 0.1822241 | 0.0000784 | 0.0000128 | -37.579 |
| 0.36469808 | 0.2797915 | 0.1510841 | 0.0000630 | 0.0000102 | -30.332 |
| 0.26424871 | 0.2023536 | 0.1105276 | 0.0000436 | 0.0000070 | -18.245 |
| 0.15831200 | 0.1156483 | 0.0620350 | 0.0000196 | 0.0000033 | -3.606 |
| 0.04617627 | 0.0228880 | 0.0081653 | -0.0000056 | -0.0000006 | 12.496 |
| -0.07350315 | -0.0733195 | -0.0479397 | -0.0000328 | -0.0000048 | 32.386 |
| -0.20232129 | -0.1717891 | -0.1040123 | -0.0000618 | -0.0000093 | 54.361 |
| -0.34098415 | -0.2722609 | -0.1589425 | -0.0000898 | -0.0000137 | 73.987 |
| -0.48765201 | -0.3738224 | -0.2118395 | -0.0001151 | -0.0000178 | 87.777 |
| -0.63700003 | -0.4736400 | -0.2611723 | -0.0001365 | -0.0000215 | 95.510 |
| -0.78060433 | -0.5668356 | -0.3047619 | -0.0001538 | -0.0000246 | 97.681 |
| -0.90817353 | -0.6472162 | -0.3402451 | -0.0001665 | -0.0000270 | 98.031 |
| -1.00952455 | -0.7088331 | -0.3659361 | -0.0001757 | -0.0000288 | 96.346 |
| -1.07578003 | -0.7468004 | -0.3807010 | -0.0001790 | -0.0000296 | 93.304 |
| -1.10051420 | -0.7580037 | -0.3838412 | -0.0001780 | -0.0000295 | 90.650 |
| -1.08105819 | -0.7418795 | -0.3754315 | -0.0001731 | -0.0000287 | 90.505 |
| -1.01959702 | -0.7009785 | -0.3568377 | -0.0001658 | -0.0000272 | 94.205 |
| -0.92337930 | -0.6407988 | -0.3307542 | -0.0001567 | -0.0000254 | 98.924 |
| -0.80339500 | -0.5684155 | -0.3002218 | -0.0001453 | -0.0000231 | 103.292 |
| -0.67269522 | -0.4911835 | -0.2679101 | -0.0001332 | -0.0000207 | 105.586 |
| -0.54456300 | -0.4157268 | -0.2358196 | -0.0001205 | -0.0000183 | 106.808 |
| -0.43120010 | -0.3477509 | -0.2057475 | -0.0001093 | -0.0000162 | 107.319 |
| -0.34242012 | -0.2919255 | -0.1795533 | -0.0000995 | -0.0000144 | 105.838 |
| -0.28429894 | -0.2514732 | -0.1588370 | -0.0000913 | -0.0000130 | 102.270 |
| -0.25854666 | -0.2279593 | -0.1446553 | -0.0000853 | -0.0000122 | 96.207 |
| -0.26260622 | -0.2211708 | -0.1373123 | -0.0000812 | -0.0000117 | 89.295 |
| -0.29065249 | -0.2293505 | -0.1365159 | -0.0000797 | -0.0000118 | 81.048 |
| -0.33454410 | -0.2491019 | -0.1411754 | -0.0000791 | -0.0000120 | 71.621 |
| -0.38491045 | -0.2754780 | -0.1493127 | -0.0000793 | -0.0000125 | 61.049 |
| -0.43211095 | -0.3022689 | -0.1580930 | -0.0000786 | -0.0000127 | 48.628 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| -0.46712714 | -0.3226830 | -0.1641824 | -0.0000765 | -0.0000127 | 39.086 |
| -0.48329517 | -0.3312766 | -0.1652088 | -0.0000747 | -0.0000126 | 32.944 |
| -0.47673540 | -0.3247715 | -0.1599993 | -0.0000701 | -0.0000119 | 25.969 |
| -0.44540676 | -0.3014232 | -0.1475708 | -0.0000614 | -0.0000106 | 18.530 |
| -0.38897724 | -0.2609700 | -0.1271651 | -0.0000503 | -0.0000088 | 10.845 |
| -0.30885590 | -0.2045316 | -0.0986259 | -0.0000356 | -0.0000064 | 2.693 |
| -0.20804976 | -0.1342842 | -0.0626313 | -0.0000183 | -0.0000035 | -5.442 |
| -0.09105047 | -0.0532935 | -0.0208388 | 0.0000007 | -0.0000003 | -13.184 |
| 0.03641886 | 0.0345996 | 0.0242882 | 0.0000207 | 0.0000031 | -20.729 |
| 0.16788456 | 0.1250021 | 0.0699967 | 0.0000407 | 0.0000065 | -28.047 |
| 0.29659779 | 0.2132149 | 0.1137250 | 0.0000596 | 0.0000097 | -34.871 |
| 0.41584322 | 0.2944465 | 0.1532766 | 0.0000762 | 0.0000125 | -39.724 |
| 0.51890088 | 0.3638171 | 0.1865244 | 0.0000889 | 0.0000148 | -41.290 |
| 0.59919489 | 0.4165941 | 0.2112760 | 0.0000973 | 0.0000163 | -41.851 |
| 0.65130482 | 0.4492184 | 0.2259784 | 0.0001023 | 0.0000172 | -42.355 |
| 0.67176984 | 0.4599712 | 0.2301301 | 0.0001029 | 0.0000174 | -42.783 |
| 0.65949031 | 0.4490771 | 0.2242110 | -0.0000998 | 0.0000168 | -43.183 |
| 0.61590857 | 0.4184970 | 0.2094289 | 0.0000932 | 0.0000156 | -42.867 |
| 0.54477305 | 0.3713450 | 0.1872609 | 0.0000831 | 0.0000138 | -40.751 |
| 0.45158992 | 0.3111877 | 0.1590550 | 0.0000701 | 0.0000115 | -37.247 |
| 0.34318597 | 0.2417652 | 0.1261307 | 0.0000553 | 0.0000089 | -32.966 |
| 0.22705317 | 0.1668189 | 0.0899173 | 0.0000390 | 0.0000061 | -26.302 |
| 0.11021255 | 0.0896565 | 0.0517008 | 0.0000211 | 0.0000031 | -18.622 |
| -0.00126407 | 0.0133887 | 0.0129163 | 0.0000039 | 0.0000002 | -10.831 |
| -0.10255734 | -0.0588708 | -0.0247011 | -0.0000128 | -0.0000025 | -2.543 |
| -0.19042887 | -0.1242054 | -0.0593884 | -0.0000283 | -0.0000050 | 5.615 |
| -0.26309011 | -0.1800410 | -0.0895165 | -0.0000415 | -0.0000071 | 13.233 |
| -0.31979787 | -0.2243084 | -0.1137043 | -0.0000521 | -0.0000088 | 19.225 |
| -0.36028674 | -0.2555180 | -0.1308462 | -0.0000592 | -0.0000099 | 23.945 |
| -0.38454095 | -0.2730245 | -0.1403807 | -0.0000633 | -0.0000105 | 27.262 |
| -0.39257726 | -0.2770034 | -0.1423269 | -0.0000638 | -0.0000106 | 27.768 |
| -0.38424921 | -0.2681193 | -0.1370646 | -0.0000607 | -0.0000101 | 27.554 |
| -0.35994600 | -0.2478459 | -0.1257212 | -0.0000563 | -0.0000093 | 27.679 |
| -0.32119932 | -0.2185944 | -0.1102146 | -0.0000502 | -0.0000083 | 27.982 |
| -0.27082779 | -0.1834184 | -0.0927506 | -0.0000435 | -0.0000071 | 28.245 |
| -0.21283752 | -0.1456164 | -0.0752618 | -0.0000366 | -0.0000058 | 28.322 |
| -0.15208126 | -0.1083027 | -0.0590239 | -0.0000300 | -0.0000046 | 27.288 |
| -0.09343370 | -0.0737509 | -0.0443249 | -0.0000229 | -0.0000033 | 23.115 |
| -0.04069188 | -0.0427390 | -0.0303503 | -0.0000149 | -0.0000020 | 17.125 |
| 0.00385807 | -0.0147977 | -0.0159422 | -0.0000070 | -0.0000008 | 9.091 |
| 0.03997392 | 0.0115422 | -0.0000595 | 0.0000026 | 0.0000006 | -1.433 |
| 0.06962379 | 0.0382715 | 0.0179274 | 0.0000129 | 0.0000021 | -10.918 |
| 0.09598812 | 0.0666624 | 0.0375438 | 0.0000223 | 0.0000034 | -19.561 |
| 0.12283877 | 0.0969990 | 0.0576209 | 0.0000324 | 0.0000049 | -28.176 |
| 0.15409459 | 0.1290691 | 0.0772344 | 0.0000427 | 0.0000064 | -38.455 |
| 0.19344764 | 0.1630410 | 0.0965225 | 0.0000543 | 0.0000081 | -50.277 |
| 0.24346729 | 0.1996712 | 0.1164225 | 0.0000659 | 0.0000099 | -59.311 |
| 0.30411638 | 0.2393288 | 0.1372980 | 0.0000758 | 0.0000115 | -64.993 |
| 0.37271638 | 0.2816866 | 0.1586943 | 0.0000858 | 0.0000132 | -70.610 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 0.44528823 | 0.3261708 | 0.1802066 | 0.0000964 | 0.0000150 | -75.335 |
| 0.51726081 | 0.3715758 | 0.2014826 | 0.0001057 | 0.0000167 | -78.671 |
| 0.58404540 | 0.4157855 | 0.2220049 | 0.0001145 | 0.0000182 | -81.369 |
| 0.64168382 | 0.4560684 | 0.2410566 | 0.0001222 | 0.0000195 | -82.925 |
| 0.68705759 | 0.4894401 | 0.2575357 | 0.0001281 | 0.0000206 | -83.889 |
| 0.71812281 | 0.5133525 | 0.2701561 | 0.0001327 | 0.0000213 | -85.617 |
| 0.73426421 | 0.5265325 | 0.2780348 | 0.0001361 | 0.0000218 | -89.082 |
| 0.73643647 | 0.5294203 | 0.2811335 | 0.0001384 | 0.0000221 | -93.486 |
| 0.72683957 | 0.5238711 | 0.2801594 | 0.0001391 | 0.0000221 | -98.252 |
| 0.70855053 | 0.5125998 | 0.2763146 | 0.0001390 | 0.0000219 | -102.716 |
| 0.68505545 | 0.4984592 | 0.2708976 | 0.0001377 | 0.0000216 | -104.992 |
| 0.65953390 | 0.4835736 | 0.2647297 | 0.0001351 | 0.0000211 | -105.201 |
| 0.63447340 | 0.4690203 | 0.2580597 | 0.0001318 | 0.0000205 | -102.707 |
| 0.61133179 | 0.4547934 | 0.2506348 | 0.0001273 | 0.0000198 | -99.361 |
| 0.59071924 | 0.4404249 | 0.2422540 | 0.0001230 | 0.0000191 | -95.446 |
| 0.57218214 | 0.4251695 | 0.2327407 | 0.0001173 | 0.0000183 | -87.477 |
| 0.55322310 | 0.4072197 | 0.2210257 | 0.0001081 | 0.0000171 | -74.249 |
| 0.52915418 | 0.3834834 | 0.2050491 | 0.0000961 | 0.0000154 | -58.444 |
| 0.49424948 | 0.3504620 | 0.1828641 | 0.0000818 | 0.0000134 | -41.739 |
| 0.44293882 | 0.3050978 | 0.1534698 | 0.0000645 | 0.0000109 | -24.874 |
| 0.37074719 | 0.2453804 | 0.1169867 | 0.0000448 | 0.0000079 | -8.947 |
| 0.27527483 | 0.1709956 | 0.0745802 | 0.0000237 | 0.0000046 | 4.238 |
| 0.15744486 | 0.0841830 | 0.0285696 | 0.0000032 | 0.0000012 | 10.103 |
| 0.02276260 | -0.0094936 | -0.0173305 | -0.0000142 | -0.0000020 | 12.269 |
| -0.11971200 | -0.1026871 | -0.0595672 | -0.0000313 | -0.0000051 | 13.994 |
| -0.25892066 | -0.1881522 | -0.0959277 | -0.0000457 | -0.0000078 | 13.790 |
| -0.38271473 | -0.2595044 | -0.1251038 | -0.0000562 | -0.0000098 | 13.153 |
| -0.47958208 | -0.3121244 | -0.1464444 | -0.0000642 | -0.0000114 | 13.267 |
| -0.54071744 | -0.3437936 | -0.1599078 | -0.0000693 | -0.0000123 | 16.588 |
| -0.56215722 | -0.3551450 | -0.1663745 | -0.0000736 | -0.0000129 | 24.537 |
| -0.54602144 | -0.3495111 | -0.1676980 | -0.0000770 | -0.0000131 | 35.896 |
| -0.50006518 | -0.3318594 | -0.1659903 | -0.0000793 | -0.0000130 | 47.230 |
| -0.43589342 | -0.3074196 | -0.1627103 | -0.0000803 | -0.0000127 | 59.140 |
| -0.36725269 | -0.2813394 | -0.1588610 | -0.0000819 | -0.0000125 | 70.107 |
| -0.30771130 | -0.2583102 | -0.1551693 | -0.0000829 | -0.0000122 | 79.653 |
| -0.26850001 | -0.2423915 | -0.1524007 | -0.0000845 | -0.0000122 | 87.080 |
| -0.25687116 | -0.2368501 | -0.1515683 | -0.0000866 | -0.0000124 | 92.597 |
| -0.27539566 | -0.2440598 | -0.1540300 | -0.0000900 | -0.0000130 | 96.137 |
| -0.32178112 | -0.2649415 | -0.1609684 | -0.0000938 | -0.0000138 | 93.285 |
| -0.38866069 | -0.2975986 | -0.1720469 | -0.0000960 | -0.0000146 | 85.997 |
| -0.46533269 | -0.3375621 | -0.1856600 | -0.0000992 | -0.0000155 | 77.698 |
| -0.54005434 | -0.3787476 | -0.1996694 | -0.0001016 | -0.0000163 | 66.153 |
| -0.60073827 | -0.4133337 | -0.2107954 | -0.0000997 | -0.0000165 | 48.437 |
| -0.63557447 | -0.4322068 | -0.2145053 | -0.0000934 | -0.0000160 | 33.426 |
| -0.63605313 | -0.4283190 | -0.2077093 | -0.0000874 | -0.0000152 | 25.052 |
| -0.59875092 | -0.3989875 | -0.1901777 | -0.0000785 | -0.0000137 | 21.200 |
| -0.52518539 | -0.3460412 | -0.1638294 | -0.0000676 | -0.0000118 | 22.733 |
| -0.42159659 | -0.2754149 | -0.1319593 | -0.0000565 | -0.0000096 | 25.741 |
| -0.29768045 | -0.1952689 | -0.0978333 | -0.0000434 | -0.0000070 | 29.421 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELE- RATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------------|--------------------------------|-------------------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| -0.16550934 | -0.1142517 | -0.0641806 | -0.0000314 | -0.0000046 | 32.636 |
| -0.03801927 | -0.0398055 | -0.0329862 | -0.0000192 | -0.0000023 | 31.918 |
| 0.07339376 | 0.0235702 | -0.0049556 | -0.0000063 | -0.0000000 | 25.630 |
| 0.16091618 | 0.0748517 | 0.0204357 | 0.0000070 | 0.0000021 | 15.323 |
| 0.22132551 | 0.1155840 | 0.0441599 | 0.0000200 | 0.0000040 | 1.344 |
| 0.25663916 | 0.1489056 | 0.0672985 | 0.0000341 | 0.0000059 | -16.877 |
| 0.27390713 | 0.1786764 | 0.0909278 | 0.0000488 | 0.0000079 | -34.515 |
| 0.28291831 | 0.2078158 | 0.1150993 | 0.0000617 | 0.0000096 | -49.274 |
| 0.29369894 | 0.2376033 | 0.1386370 | 0.0000737 | 0.0000112 | -61.344 |
| 0.31465248 | 0.2682453 | 0.1600413 | 0.0000846 | 0.0000127 | -72.351 |
| 0.35114349 | 0.2997448 | 0.1784775 | 0.0000946 | 0.0000142 | -79.024 |
| 0.40364876 | 0.3314800 | 0.1933623 | 0.0001006 | 0.0000154 | -79.425 |
| 0.46736251 | 0.3619697 | 0.2041800 | 0.0001044 | 0.0000162 | -78.919 |
| 0.53433535 | 0.3899327 | 0.2115196 | 0.0001082 | 0.0000171 | -76.846 |
| 0.59523278 | 0.4141291 | 0.2166424 | 0.0001094 | 0.0000176 | -74.014 |
| 0.64113530 | 0.4330120 | 0.2206236 | 0.0001101 | 0.0000179 | -68.675 |
| 0.66459085 | 0.4440096 | 0.2231339 | 0.0001075 | 0.0000178 | -59.921 |
| 0.66038171 | 0.4433636 | 0.2220436 | 0.0001024 | 0.0000171 | -50.347 |
| 0.62646681 | 0.4271958 | 0.2145003 | 0.0000951 | 0.0000160 | -41.540 |
| 0.56428020 | 0.3928652 | 0.1983108 | 0.0000851 | 0.0000143 | -36.309 |
| 0.47872454 | 0.3405287 | 0.1733011 | 0.0000743 | 0.0000123 | -35.759 |
| 0.37747751 | 0.2739055 | 0.1416709 | 0.0000626 | 0.0000101 | -38.017 |
| 0.26961101 | 0.1996864 | 0.1071067 | 0.0000506 | 0.0000078 | -41.794 |
| 0.16450864 | 0.1263164 | 0.0737561 | 0.0000396 | 0.0000057 | -46.101 |
| 0.07111747 | 0.0623715 | 0.0453792 | 0.0000306 | -0.0000039 | -49.060 |
| -0.00291906 | 0.0146140 | 0.0245238 | 0.0000233 | 0.0000026 | -48.749 |
| -0.05214431 | -0.0135396 | 0.0120358 | 0.0000179 | 0.0000017 | -45.479 |
| -0.07374563 | -0.0222808 | 0.0073338 | 0.0000150 | 0.0000013 | -39.989 |
| -0.06800142 | -0.0148372 | 0.0088159 | 0.0000135 | 0.0000012 | -31.081 |
| -0.03886499 | 0.0033487 | 0.0139911 | 0.0000122 | 0.0000014 | -21.321 |
| 0.00649023 | 0.0262127 | 0.0202322 | 0.0000119 | 0.0000017 | -10.294 |
| 0.05822755 | 0.0479524 | 0.0250289 | 0.0000100 | 0.0000018 | 1.149 |
| 0.10535887 | 0.0638535 | 0.0265407 | 0.0000079 | 0.0000018 | 8.539 |
| 0.13849245 | 0.0715488 | 0.0247289 | 0.0000071 | 0.0000018 | 10.294 |
| 0.15181818 | 0.0711933 | 0.0212752 | 0.0000067 | 0.0000018 | 9.178 |
| 0.14352244 | 0.0642958 | 0.0180663 | 0.0000060 | 0.0000016 | 6.716 |
| 0.11571011 | 0.0527304 | 0.0160512 | 0.0000057 | 0.0000014 | 3.293 |
| 0.07402657 | 0.0383744 | 0.0150929 | 0.0000059 | 0.0000011 | -1.961 |
| 0.02662871 | 0.0230259 | 0.0144050 | 0.0000064 | 0.0000009 | -4.887 |
| -0.01847160 | 0.0073911 | 0.0122397 | 0.0000038 | 0.0000003 | -2.848 |
| -0.05579203 | -0.0093710 | 0.0061762 | -0.0000011 | -0.0000005 | 2.253 |
| -0.08324316 | -0.0287900 | -0.0055157 | -0.0000081 | -0.0000015 | 9.789 |
| -0.10250295 | -0.0524089 | -0.0231946 | -0.0000180 | -0.0000028 | 20.777 |
| -0.11895968 | -0.0816776 | -0.0461985 | -0.0000308 | -0.0000046 | 34.247 |
| -0.14025024 | -0.1175108 | -0.0730866 | -0.0000448 | -0.0000065 | 46.062 |
| -0.17342559 | -0.1593071 | -0.1013795 | -0.0000575 | -0.0000084 | 53.620 |
| -0.22238979 | -0.2045868 | -0.1278434 | -0.0000681 | -0.0000101 | 56.659 |
| -0.28655583 | -0.2495897 | -0.1494934 | -0.0000762 | -0.0000116 | 56.659 |
| -0.36093865 | -0.2904969 | -0.1647735 | -0.0000820 | -0.0000128 | 56.178 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| -0.43741856 | -0.3246422 | -0.1741832 | -0.0000864 | -0.0000138 | 55.391 |
| -0.50629659 | -0.3507676 | -0.1796100 | -0.0000889 | -0.0000145 | 54.405 |
| -0.55818126 | -0.3686580 | -0.1831308 | -0.0000904 | -0.0000149 | 52.884 |
| -0.58581577 | -0.3783981 | -0.1858972 | -0.0000905 | -0.0000151 | 50.864 |
| -0.58557549 | -0.3797865 | -0.1877169 | -0.0000898 | -0.0000150 | 49.806 |
| -0.55845020 | -0.3724227 | -0.1875749 | -0.0000888 | -0.0000146 | 50.764 |
| -0.50979472 | -0.3560594 | -0.1843023 | -0.0000868 | -0.0000141 | 51.779 |
| -0.44752434 | -0.3306669 | -0.1767003 | -0.0000826 | -0.0000132 | 52.398 |
| -0.38012307 | -0.2968974 | -0.1639277 | -0.0000768 | -0.0000120 | 52.388 |
| -0.31494708 | -0.2565787 | -0.1459863 | -0.0000692 | -0.0000106 | 51.942 |
| -0.25715895 | -0.2128730 | -0.1240547 | -0.0000607 | -0.0000092 | 50.746 |
| -0.20920354 | -0.1697178 | -0.1002708 | -0.0000513 | -0.0000076 | 46.882 |
| -0.17065892 | -0.1305526 | -0.0768851 | -0.0000408 | -0.0000061 | 40.221 |
| -0.13914607 | -0.0975515 | -0.0558246 | -0.0000312 | -0.0000046 | 34.083 |
| -0.11208718 | -0.0717974 | -0.0388548 | -0.0000238 | -0.0000035 | 27.525 |
| -0.08729871 | -0.0528811 | -0.0267862 | -0.0000166 | -0.0000025 | 18.899 |
| -0.06288062 | -0.0385953 | -0.0186732 | -0.0000100 | -0.0000016 | 8.996 |
| -0.03736558 | -0.0256044 | -0.0121827 | -0.0000037 | -0.0000007 | -0.166 |
| -0.01002386 | -0.0107075 | -0.0048004 | 0.0000020 | 0.0000002 | -6.906 |
| 0.01921237 | 0.0082053 | 0.0051674 | 0.0000078 | 0.0000011 | -13.518 |
| 0.05066467 | 0.0323046 | 0.0186743 | 0.0000158 | 0.0000023 | -20.420 |
| 0.08522968 | 0.0618690 | 0.0358940 | 0.0000245 | 0.0000036 | -26.559 |
| 0.12384366 | 0.0960115 | 0.0559083 | 0.0000334 | 0.0000050 | -30.195 |
| 0.16662970 | 0.1325081 | 0.0766425 | 0.0000413 | 0.0000064 | -32.345 |
| 0.21261487 | 0.1683954 | 0.0956700 | 0.0000488 | 0.0000076 | -33.346 |
| 0.25954878 | 0.2006040 | 0.1109842 | 0.0000543 | 0.0000086 | -33.378 |
| 0.30404984 | 0.2266028 | 0.1215576 | 0.0000585 | 0.0000094 | -34.818 |
| 0.34253644 | 0.2453233 | 0.1278920 | 0.0000624 | 0.0000101 | -38.017 |
| 0.37195803 | 0.2573141 | 0.1316267 | 0.0000653 | 0.0000106 | -41.411 |
| 0.39015832 | 0.2640641 | 0.1344545 | 0.0000675 | 0.0000109 | -44.861 |
| 0.39644663 | 0.2673729 | 0.1374704 | 0.0000697 | 0.0000112 | -48.298 |
| 0.39191695 | 0.2687285 | 0.1409195 | 0.0000715 | 0.0000114 | -50.526 |
| 0.37909337 | 0.2686599 | 0.1441070 | 0.0000722 | 0.0000114 | -51.544 |
| 0.36141654 | 0.2667602 | 0.1458697 | 0.0000724 | 0.0000114 | -52.545 |
| 0.34265520 | 0.2623215 | 0.1453144 | 0.0000720 | 0.0000112 | -52.746 |
| 0.32584636 | 0.2547490 | 0.1419898 | 0.0000701 | 0.0000109 | -52.004 |
| 0.31256271 | 0.2439952 | 0.1359597 | 0.0000674 | 0.0000105 | -51.050 |
| 0.30277699 | 0.2308435 | 0.1278567 | 0.0000641 | 0.0000100 | -48.818 |
| 0.29480294 | 0.2163888 | 0.1184245 | 0.0000593 | 0.0000093 | -44.185 |
| 0.28544485 | 0.2010834 | 0.1079175 | 0.0000529 | 0.0000084 | -35.434 |
| 0.27024998 | 0.1837342 | 0.0955893 | 0.0000437 | 0.0000072 | -22.553 |
| 0.24431379 | 0.1614299 | 0.0799521 | 0.0000324 | 0.0000056 | -9.153 |
| 0.20371731 | 0.1307909 | 0.0598621 | 0.0000203 | 0.0000038 | 3.690 |
| 0.14625211 | 0.0891432 | 0.0349571 | 0.0000063 | 0.0000017 | 14.586 |
| 0.07172101 | 0.0355336 | 0.0056742 | -0.0000083 | -0.0000007 | 24.179 |
| -0.01838338 | -0.0290757 | -0.0272626 | -0.0000246 | -0.0000033 | 33.651 |
| -0.12127143 | -0.1021691 | -0.0631993 | -0.0000417 | -0.0000062 | 41.444 |
| -0.23257084 | -0.1797982 | -0.1010168 | -0.0000581 | -0.0000090 | 46.408 |
| -0.34626068 | -0.2570524 | -0.1387535 | -0.0000736 | -0.0000117 | 50.770 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| -0.45553706 | -0.3292236 | -0.1741673 | -0.0000885 | -0.0000143 | 54.633 |
| -0.55350854 | -0.3923556 | -0.2051084 | -0.0001009 | -0.0000164 | 57.888 |
| -0.63387819 | -0.4433708 | -0.2298195 | -0.0001109 | -0.0000182 | 61.136 |
| -0.69170476 | -0.4801091 | -0.2472397 | -0.0001179 | -0.0000194 | 63.302 |
| -0.72366216 | -0.5009908 | -0.2567970 | -0.0001208 | -0.0000199 | 63.610 |
| -0.72817646 | -0.5048933 | -0.2582008 | -0.0001201 | -0.0000198 | 63.444 |
| -0.70587133 | -0.4917091 | -0.2517280 | -0.0001168 | -0.0000192 | 64.125 |
| -0.65988386 | -0.4630191 | -0.2385312 | -0.0001117 | -0.0000182 | 66.997 |
| -0.59581118 | -0.4224263 | -0.2206679 | -0.0001058 | -0.0000169 | 70.579 |
| -0.52078686 | -0.3748653 | -0.2003944 | -0.0000984 | -0.0000155 | 73.051 |
| -0.44227466 | -0.3254345 | -0.1794325 | -0.0000902 | -0.0000139 | 73.184 |
| -0.36698496 | -0.2782798 | -0.1586704 | -0.0000811 | -0.0000123 | 69.963 |
| -0.30012900 | -0.2359563 | -0.1383881 | -0.0000715 | -0.0000107 | 66.287 |
| -0.24558891 | -0.1999776 | -0.1192470 | -0.0000637 | -0.0000094 | 62.752 |
| -0.20574556 | -0.1712212 | -0.1024644 | -0.0000565 | -0.0000083 | 58.553 |
| -0.18101415 | -0.1499699 | -0.0891728 | -0.0000504 | -0.0000074 | 53.031 |
| -0.16973640 | -0.1359328 | -0.0798084 | -0.0000453 | -0.0000067 | 47.064 |
| -0.16871236 | -0.1283886 | -0.0740465 | -0.0000416 | -0.0000062 | 40.300 |
| -0.17366672 | -0.1258788 | -0.0707621 | -0.0000378 | -0.0000058 | 31.738 |
| -0.17966980 | -0.1258135 | -0.0681431 | -0.0000336 | -0.0000054 | 22.874 |
| -0.18204562 | -0.1248946 | -0.0644422 | -0.0000295 | -0.0000049 | 14.975 |
| -0.17710297 | -0.1198712 | -0.0585592 | -0.0000248 | -0.0000043 | 8.148 |
| -0.16231710 | -0.1081529 | -0.0500028 | -0.0000193 | -0.0000035 | 1.887 |
| -0.13626606 | -0.0882640 | -0.0385877 | -0.0000128 | -0.0000025 | -2.925 |
| -0.09886402 | -0.0603490 | -0.0244858 | -0.0000061 | -0.0000014 | -5.750 |
| -0.05147210 | -0.0261507 | -0.0082537 | 0.0000010 | -0.0000001 | -8.357 |
| 0.00352463 | 0.0118525 | 0.0095216 | 0.0000092 | 0.0000013 | -10.985 |
| 0.06294602 | 0.0511342 | 0.0282093 | 0.0000173 | 0.0000027 | -13.535 |
| 0.12309776 | 0.0895747 | 0.0470527 | 0.0000256 | 0.0000041 | -17.195 |
| 0.18057737 | 0.1260039 | 0.0655343 | 0.0000348 | 0.0000056 | -23.728 |
| 0.23315424 | 0.1604570 | 0.0837478 | 0.0000447 | 0.0000072 | -31.026 |
| 0.27964781 | 0.1933220 | 0.1018161 | 0.0000535 | 0.0000086 | -37.261 |
| 0.31970528 | 0.2245930 | 0.1194583 | 0.0000620 | 0.0000099 | -44.333 |
| 0.35423093 | 0.2542072 | 0.1365059 | 0.0000711 | 0.0000112 | -52.741 |
| 0.38528753 | 0.2823189 | 0.1530993 | 0.0000801 | 0.0000126 | -60.924 |
| 0.41519511 | 0.3090639 | 0.1692277 | 0.0000883 | 0.0000138 | -67.445 |
| 0.44556667 | 0.3342802 | 0.1843431 | 0.0000952 | 0.0000149 | -71.856 |
| 0.47673627 | 0.3574079 | 0.1974356 | 0.0001007 | 0.0000158 | -73.877 |
| 0.50752997 | 0.3774265 | 0.2073555 | 0.0001042 | 0.0000164 | -73.743 |
| 0.53532214 | 0.3928186 | 0.2131323 | 0.0001054 | 0.0000167 | -70.341 |
| 0.55602503 | 0.4013231 | 0.2138536 | 0.0001031 | 0.0000166 | -63.301 |
| 0.56448573 | 0.4000533 | 0.2086167 | 0.0000977 | 0.0000159 | -54.439 |
| 0.55562618 | 0.3863585 | 0.1969547 | 0.0000899 | 0.0000149 | -46.038 |
| 0.52557885 | 0.3586595 | 0.1790705 | 0.0000798 | 0.0000134 | -36.139 |
| 0.47185155 | 0.3162579 | 0.1551488 | 0.0000660 | 0.0000112 | -25.537 |
| 0.39401607 | 0.2596329 | 0.1254729 | 0.0000511 | 0.0000088 | -18.278 |
| 0.29487838 | 0.1912757 | 0.0913215 | 0.0000363 | 0.0000062 | -13.448 |
| 0.18012135 | 0.1151699 | 0.0546148 | 0.0000201 | 0.0000034 | -8.072 |
| 0.05701912 | 0.0356075 | 0.0170057 | 0.0000032 | 0.0000005 | -2.801 |

ANNEXE B

**TABLEAUX DES DEPLACEMENTS DES NIVEAUX
EN FONCTION DES ACCELERATIONS
(STRUCTURE AVEC FONDATION)**

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 0.00277333 | 0.0027440 | 0.0024663 | 0.0000084 | 0.0000010 | -42.264 |
| 0.01897165 | 0.0186312 | 0.0161203 | 0.0000338 | 0.0000041 | -36.642 |
| 0.04866159 | 0.0468521 | 0.0371985 | 0.0000159 | 0.0000025 | -24.285 |
| 0.08645901 | 0.0802583 | 0.0565844 | 0.0000292 | 0.0000043 | -9.979 |
| 0.12565818 | 0.1099376 | 0.0668908 | 0.0000221 | 0.0000039 | -0.621 |
| 0.16037625 | 0.1287200 | 0.0662835 | 0.0000251 | 0.0000043 | -1.925 |
| 0.18754863 | 0.1348364 | 0.0595557 | 0.0000273 | 0.0000048 | -16.327 |
| 0.20840362 | 0.1341254 | 0.0561967 | 0.0000373 | 0.0000059 | -44.616 |
| 0.22993839 | 0.1402373 | 0.0673109 | 0.0000576 | 0.0000084 | -88.817 |
| 0.26561046 | 0.1719892 | 0.1024710 | 0.0000898 | 0.0000125 | -132.674 |
| 0.33073248 | 0.2446692 | 0.1640618 | 0.0001231 | 0.0000172 | -158.848 |
| 0.43667217 | 0.3616470 | 0.2445748 | 0.0001553 | 0.0000222 | -172.074 |
| 0.58766407 | 0.5121827 | 0.3300869 | 0.0001844 | 0.0000273 | -152.083 |
| 0.77255170 | 0.6684142 | 0.4004350 | 0.0001877 | 0.0000294 | -96.127 |
| 0.96291439 | 0.7915617 | 0.4348129 | 0.0001773 | 0.0000296 | -50.391 |
| 1.12199589 | 0.8485397 | 0.4234659 | 0.0001612 | 0.0000285 | 14.421 |
| 1.20168762 | 0.8124821 | 0.3613572 | 0.0001021 | 0.0000215 | 101.379 |
| 1.14947994 | 0.6666817 | 0.2469260 | 0.0000346 | 0.0000122 | 146.042 |
| 0.93444781 | 0.4211865 | 0.0956240 | -0.0000141 | 0.0000037 | 129.115 |
| 0.56193318 | 0.1143550 | -0.0607829 | -0.0000547 | -0.0000046 | 91.098 |
| 0.06825150 | -0.2052035 | -0.1927442 | -0.0000943 | -0.0000132 | 53.548 |
| -0.48684035 | -0.4941761 | -0.2850927 | -0.0001216 | -0.0000203 | 16.666 |
| -1.02716519 | -0.7214173 | -0.3369800 | -0.0001355 | -0.0000252 | -14.048 |
| -1.47352403 | -0.8718854 | -0.3580940 | -0.0001438 | -0.0000284 | -21.076 |
| -1.76292488 | -0.9490533 | -0.3653890 | -0.0001572 | -0.0000312 | -0.073 |
| -1.86508503 | -0.9720238 | -0.3779925 | -0.0001795 | -0.0000339 | 61.569 |
| -1.79324396 | -0.9705246 | -0.4132233 | -0.0002209 | -0.0000381 | 139.218 |
| -1.59674609 | -0.9706354 | -0.4761659 | -0.0002567 | -0.0000415 | 185.426 |
| -1.34104330 | -0.9797528 | -0.5512319 | -0.0002777 | -0.0000430 | 214.420 |
| -1.09481352 | -0.9897792 | -0.6127047 | -0.0002982 | -0.0000445 | 223.663 |
| -0.91439336 | -0.9843348 | -0.6367501 | -0.0002958 | -0.0000437 | 220.061 |
| -0.83071552 | -0.9481220 | -0.6109061 | -0.0002806 | -0.0000414 | 198.762 |
| -0.84057816 | -0.8727417 | -0.5361087 | -0.0002420 | -0.0000365 | 162.240 |
| -0.90849446 | -0.7599817 | -0.4249943 | -0.0001928 | -0.0000303 | 121.367 |
| -0.97944772 | -0.6221338 | -0.2985367 | -0.0001403 | -0.0000236 | 82.104 |
| -0.99546522 | -0.4764340 | -0.1792000 | -0.0000884 | -0.0000167 | 37.177 |
| -0.91025774 | -0.3355435 | -0.0822714 | -0.0000384 | -0.0000096 | -2.312 |
| -0.70325368 | -0.2036952 | -0.0134599 | -0.0000018 | -0.0000036 | -31.231 |
| -0.38509261 | -0.0763533 | 0.0311065 | 0.0000283 | 0.0000020 | -53.959 |
| 0.00815132 | 0.0581217 | 0.0643209 | 0.0000565 | 0.0000077 | -76.495 |
| 0.42773916 | 0.2140082 | 0.1049538 | 0.0000890 | 0.0000140 | -99.751 |
| 0.82560588 | 0.4010357 | 0.1705807 | 0.0001270 | 0.0000211 | -114.209 |
| 1.16410212 | 0.6172640 | 0.2690728 | 0.0001688 | 0.0000285 | -128.433 |
| 1.42391951 | 0.8488356 | 0.3960318 | 0.0002198 | 0.0000368 | -136.854 |
| 1.60281854 | 1.0709166 | 0.5337039 | 0.0002628 | 0.0000438 | -129.614 |
| 1.70780016 | 1.2507493 | 0.6535919 | 0.0002919 | 0.0000485 | -113.212 |
| 1.74746934 | 1.3554124 | 0.7255207 | 0.0003016 | 0.0000503 | -82.815 |
| 1.72415270 | 1.3587624 | 0.7265400 | 0.0002820 | 0.0000477 | -56.866 |
| 1.63450611 | 1.2517123 | 0.6518327 | 0.0002499 | 0.0000426 | -54.008 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 1.47444080 | 1.0487006 | 0.5190429 | 0.0002069 | 0.0000354 | -62.194 |
| 1.24155216 | 0.7829122 | 0.3596085 | 0.0001549 | 0.0000266 | -82.008 |
| 0.94199657 | 0.4993036 | 0.2087871 | 0.0001138 | 0.0000188 | -115.710 |
| 0.59780763 | 0.2459124 | 0.0969160 | 0.0000877 | 0.0000129 | -153.147 |
| 0.24813041 | 0.0625573 | 0.0414712 | 0.0000784 | 0.0000095 | -189.215 |
| -0.05436810 | -0.0269617 | 0.0447362 | 0.0000886 | 0.0000093 | -221.080 |
| -0.25268604 | -0.0177595 | 0.0961634 | 0.0001121 | 0.0000116 | -236.368 |
| -0.30005892 | 0.0767989 | 0.1762210 | 0.0001393 | 0.0000156 | -239.888 |
| -0.17208847 | 0.2322191 | 0.2638608 | 0.0001704 | 0.0000210 | -225.405 |
| 0.12266682 | 0.4189570 | 0.3407908 | 0.0001896 | 0.0000258 | -188.467 |
| 0.53797770 | 0.6060309 | 0.3927763 | 0.0001935 | 0.0000291 | -120.672 |
| 0.99321568 | 0.7615410 | 0.4087843 | 0.0001728 | 0.0000295 | -32.045 |
| 1.38924403 | 0.8559616 | 0.3835572 | 0.0001382 | 0.0000273 | 46.890 |
| 1.63204751 | 0.8677247 | 0.3212019 | 0.0000959 | 0.0000230 | 123.920 |
| 1.64906539 | 0.7816827 | 0.2294399 | 0.0000354 | 0.0000151 | 180.550 |
| 1.40593288 | 0.5929494 | 0.1177403 | -0.0000178 | 0.0000062 | 200.113 |
| 0.91628714 | 0.3114050 | -0.0035790 | -0.0000679 | -0.0000036 | 192.183 |
| 0.23771498 | -0.0398734 | -0.1274788 | -0.0001154 | -0.0000143 | 158.871 |
| -0.53900862 | -0.4267388 | -0.2502352 | -0.0001537 | -0.0000242 | 109.933 |
| -1.30669518 | -0.8084730 | -0.3694299 | -0.0001885 | -0.0000334 | 56.985 |
| -1.96105148 | -1.1438285 | -0.4812879 | -0.0002174 | -0.0000411 | 11.502 |
| -2.41843627 | -1.3969640 | -0.5787574 | -0.0002415 | -0.0000468 | -18.825 |
| -2.62813361 | -1.5414449 | -0.6509672 | -0.0002564 | -0.0000497 | -35.322 |
| -2.57755590 | -1.5623067 | -0.6849122 | -0.0002589 | -0.0000494 | -23.782 |
| -2.29384742 | -1.4603210 | -0.6722030 | -0.0002564 | -0.0000469 | 11.428 |
| -1.83635960 | -1.2522268 | -0.6125360 | -0.0002398 | -0.0000415 | 63.072 |
| -1.28436364 | -0.9691189 | -0.5147150 | -0.0002174 | -0.0000348 | 129.651 |
| -0.72400704 | -0.6539123 | -0.3959858 | -0.0001926 | -0.0000277 | 190.153 |
| -0.23293733 | -0.3533856 | -0.2762033 | -0.0001622 | -0.0000206 | 239.203 |
| 0.12975197 | -0.1108587 | -0.1738119 | -0.0001384 | -0.0000153 | 264.984 |
| 0.33050664 | 0.0424577 | -0.1015980 | -0.0001148 | -0.0000112 | 261.401 |
| 0.36317562 | 0.0934995 | -0.0648657 | -0.0000984 | -0.0000093 | 238.563 |
| 0.24469453 | 0.0472987 | -0.0634693 | -0.0000923 | -0.0000097 | 198.392 |
| 0.01048513 | -0.0749684 | -0.0922473 | -0.0000903 | -0.0000114 | 146.143 |
| -0.29246018 | -0.2421428 | -0.1425370 | -0.0000974 | -0.0000145 | 107.975 |
| -0.61607531 | -0.4236773 | -0.2064800 | -0.0001173 | -0.0000192 | 72.515 |
| -0.91409994 | -0.5919528 | -0.2740149 | -0.0001293 | -0.0000228 | 39.320 |
| -1.14644778 | -0.7245453 | -0.3330111 | -0.0001436 | -0.0000260 | 23.990 |
| -1.28674578 | -0.8084889 | -0.3745004 | -0.0001579 | -0.0000285 | 22.972 |
| -1.32428699 | -0.8391235 | -0.3938692 | -0.0001634 | -0.0000292 | 27.059 |
| -1.26180852 | -0.8164344 | -0.3892839 | -0.0001595 | -0.0000282 | 31.299 |
| -1.11274165 | -0.7433375 | -0.3609648 | -0.0001463 | -0.0000254 | 39.115 |
| -0.89917040 | -0.6268453 | -0.3120912 | -0.0001286 | -0.0000217 | 50.012 |
| -0.64796740 | -0.4783353 | -0.2481563 | -0.0001048 | -0.0000169 | 55.727 |
| -0.38518234 | -0.3114343 | -0.1744988 | -0.0000745 | -0.0000114 | 55.891 |
| -0.13233743 | -0.1400873 | -0.0954434 | -0.0000414 | -0.0000055 | 43.929 |
| 0.09711160 | 0.0250771 | -0.0131105 | -0.0000007 | 0.0000010 | 16.526 |
| 0.29971175 | 0.1799061 | 0.0728844 | 0.0000459 | 0.0000080 | -28.156 |
| 0.48311267 | 0.3290730 | 0.1657651 | 0.0001033 | 0.0000162 | -100.918 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 0.66593319 | 0.4864084 | 0.2716138 | 0.0001728 | 0.0000260 | -168.600 |
| 0.86705680 | 0.6638630 | 0.3907147 | 0.0002301 | 0.0000346 | -211.673 |
| 1.09793929 | 0.8635843 | 0.5147172 | 0.0002855 | 0.0000432 | -250.795 |
| 1.36274457 | 1.0791876 | 0.6332819 | 0.0003389 | 0.0000518 | -255.681 |
| 1.64964488 | 1.2902457 | 0.7317913 | 0.0003600 | 0.0000567 | -225.732 |
| 1.92963339 | 1.4657732 | 0.7946791 | 0.0003693 | 0.0000598 | -193.675 |
| 2.16591422 | 1.5778903 | 0.8150172 | 0.0003691 | 0.0000612 | -164.420 |
| 2.31932438 | 1.6086245 | 0.7945775 | 0.0003499 | 0.0000595 | -126.397 |
| 2.35301627 | 1.5512657 | 0.7390072 | 0.0003175 | 0.0000552 | -114.989 |
| 2.24805721 | 1.4179668 | 0.6619468 | 0.0002988 | 0.0000514 | -138.768 |
| 2.01217927 | 1.2380040 | 0.5828427 | 0.0002810 | 0.0000471 | -171.050 |
| 1.67592478 | 1.0445819 | 0.5164110 | 0.0002619 | 0.0000423 | -201.131 |
| 1.28676667 | 0.8645615 | 0.4676053 | 0.0002469 | 0.0000379 | -222.081 |
| 0.90102395 | 0.7133804 | 0.4325198 | 0.0002315 | 0.0000338 | -234.207 |
| 0.57354887 | 0.5950384 | 0.4026911 | 0.0002164 | 0.0000303 | -228.304 |
| 0.34415891 | 0.5031882 | 0.3676100 | 0.0001907 | 0.0000261 | -197.377 |
| 0.22706107 | 0.4247486 | 0.3173427 | 0.0001557 | 0.0000213 | -153.893 |
| 0.21033180 | 0.3481724 | 0.2483955 | 0.0001192 | 0.0000166 | -114.676 |
| 0.26234362 | 0.2700661 | 0.1672816 | 0.0000836 | 0.0000123 | -75.787 |
| 0.33909412 | 0.1938412 | 0.0864459 | 0.0000467 | 0.0000078 | -41.971 |
| 0.39600818 | 0.1267649 | 0.0197157 | 0.0000196 | 0.0000044 | -19.404 |
| 0.40045744 | 0.0765485 | -0.0215749 | 0.0000030 | 0.0000022 | -6.992 |
| 0.33935057 | 0.0470644 | -0.0326657 | -0.0000032 | 0.0000010 | -1.805 |
| 0.22062856 | 0.0357639 | -0.0174940 | -0.0000011 | 0.0000007 | -1.543 |
| 0.06925833 | 0.0343928 | 0.0125566 | 0.0000059 | 0.0000010 | -5.862 |
| -0.08107861 | 0.0322512 | 0.0425227 | 0.0000133 | 0.0000013 | -7.404 |
| -0.19996314 | 0.0185760 | 0.0571710 | 0.0000116 | 0.0000006 | 3.129 |
| -0.27198101 | -0.0166997 | 0.0433452 | -0.0000055 | -0.0000018 | 35.111 |
| -0.30513432 | -0.0843114 | -0.0091351 | -0.0000462 | -0.0000070 | 101.384 |
| -0.33347230 | -0.1981632 | -0.1076252 | -0.0001147 | -0.0000158 | 188.694 |
| -0.40649834 | -0.3707235 | -0.2513787 | -0.0001938 | -0.0000266 | 256.220 |
| -0.56957600 | -0.6033277 | -0.4250820 | -0.0002693 | -0.0000377 | 310.997 |
| -0.85331068 | -0.8868292 | -0.6062322 | -0.0003515 | -0.0000503 | 345.663 |
| -1.26159670 | -1.2000494 | -0.7707941 | -0.0004095 | -0.0000608 | 320.147 |
| -1.75710696 | -1.5029952 | -0.8913827 | -0.0004254 | -0.0000665 | 244.457 |
| -2.26691971 | -1.7460686 | -0.9468384 | -0.0004213 | -0.0000694 | 186.401 |
| -2.70744341 | -1.8931262 | -0.9386605 | -0.0004154 | -0.0000709 | 141.528 |
| -2.99593231 | -1.9247637 | -0.8824164 | -0.0003756 | -0.0000671 | 63.890 |
| -3.05493742 | -1.8286840 | -0.7877990 | -0.0003054 | -0.0000581 | -2.168 |
| -2.83657888 | -1.6069809 | -0.6619340 | -0.0002468 | -0.0000485 | -24.424 |
| -2.34359929 | -1.2822820 | -0.5169870 | -0.0001921 | -0.0000378 | 3.969 |
| -1.63456293 | -0.8951624 | -0.3709767 | -0.0001534 | -0.0000278 | 71.677 |
| -0.81359870 | -0.4960849 | -0.2428666 | -0.0001267 | -0.0000189 | 155.477 |
| -0.00759981 | -0.1342878 | -0.1447602 | -0.0001070 | -0.0000115 | 215.875 |
| 0.66484691 | 0.1554681 | -0.0740627 | -0.0000793 | -0.0000043 | 228.710 |
| 1.11823318 | 0.3584193 | -0.0160171 | -0.0000476 | 0.0000018 | 223.328 |
| 1.30823047 | 0.4717850 | 0.0407299 | -0.0000260 | 0.0000053 | 195.658 |
| 1.23702334 | 0.5007825 | 0.0971625 | 0.0000024 | 0.0000080 | 160.492 |
| 0.94873138 | 0.4538397 | 0.1424277 | 0.0000174 | 0.0000080 | 112.487 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| -0.06629177 | -0.0431491 | -0.0200783 | -0.0000128 | -0.0000023 | 1.933 |
| -0.18162808 | -0.1170542 | -0.0552429 | -0.0000279 | -0.0000049 | 7.356 |
| -0.28194435 | -0.1827331 | -0.0872890 | -0.0000419 | -0.0000073 | 13.200 |
| -0.36203170 | -0.2375264 | -0.1150946 | -0.0000537 | -0.0000093 | 18.337 |
| -0.41875554 | -0.2793282 | -0.1374356 | -0.0000629 | -0.0000107 | 23.672 |
| -0.45150110 | -0.3069964 | -0.1534565 | -0.0000703 | -0.0000118 | 31.137 |
| -0.46237664 | -0.3208813 | -0.1632015 | -0.0000760 | -0.0000126 | 37.961 |
| -0.45512977 | -0.3222957 | -0.1670589 | -0.0000781 | -0.0000128 | 43.541 |
| -0.43434931 | -0.3133072 | -0.1656227 | -0.0000787 | -0.0000126 | 49.478 |
| -0.40513185 | -0.2968602 | -0.1600060 | -0.0000779 | -0.0000123 | 53.488 |
| -0.37202737 | -0.2759521 | -0.1513215 | -0.0000745 | -0.0000117 | 54.393 |
| -0.33822101 | -0.2528397 | -0.1402768 | -0.0000694 | -0.0000108 | 51.869 |
| -0.30529186 | -0.2287148 | -0.1272139 | -0.0000626 | -0.0000097 | 47.558 |
| -0.27346099 | -0.2038701 | -0.1124337 | -0.0000550 | -0.0000086 | 39.839 |
| -0.24148490 | -0.1775643 | -0.0959468 | -0.0000452 | -0.0000072 | 31.149 |
| -0.20766820 | -0.1490266 | -0.0781013 | -0.0000366 | -0.0000058 | 26.394 |
| -0.17129492 | -0.1187954 | -0.0603189 | -0.0000295 | -0.0000047 | 21.790 |
| -0.13223376 | -0.0880462 | -0.0438832 | -0.0000213 | -0.0000034 | 17.596 |
| -0.09104464 | -0.0582386 | -0.0294505 | -0.0000150 | -0.0000023 | 14.366 |
| -0.04930129 | -0.0309497 | -0.0172148 | -0.0000094 | -0.0000014 | 12.466 |
| -0.00961279 | -0.0076217 | -0.0072032 | -0.0000053 | -0.0000006 | 11.330 |
| 0.02479539 | 0.0107220 | 0.0005706 | -0.0000022 | -0.0000000 | 11.291 |
| 0.05060389 | 0.0234390 | 0.0059465 | -0.0000005 | 0.0000003 | 11.311 |
| 0.06520022 | 0.0302744 | 0.0087876 | 0.0000005 | 0.0000005 | 11.607 |
| 0.06716692 | 0.0311313 | 0.0090071 | -0.0000001 | 0.0000005 | 11.869 |
| 0.05658798 | 0.0260174 | 0.0066542 | -0.0000013 | 0.0000002 | 11.784 |
| 0.03508395 | 0.0151937 | 0.0019826 | -0.0000034 | -0.0000002 | 11.203 |
| 0.00567265 | -0.0004667 | -0.0044440 | -0.0000056 | -0.0000007 | 8.054 |
| -0.02709277 | -0.0187107 | -0.0112952 | -0.0000060 | -0.0000010 | 1.251 |
| -0.05743788 | -0.0357388 | -0.0165241 | -0.0000050 | -0.0000011 | -5.970 |
| -0.07963689 | -0.0473237 | -0.0183761 | -0.0000035 | -0.0000011 | -13.164 |
| -0.08865475 | -0.0496086 | -0.0156693 | 0.0000006 | -0.0000006 | -20.997 |
| -0.08027150 | -0.0394951 | -0.0074885 | 0.0000071 | 0.0000003 | -29.702 |
| -0.05146822 | -0.0151569 | 0.0068227 | 0.0000159 | 0.0000016 | -35.821 |
| -0.00164048 | 0.0229037 | 0.0268151 | 0.0000246 | 0.0000031 | -38.259 |
| 0.06689965 | 0.0717722 | 0.0508143 | 0.0000344 | 0.0000049 | -39.824 |
| 0.14948979 | 0.1272038 | 0.0767587 | 0.0000451 | 0.0000068 | -39.264 |
| 0.23921990 | 0.1840961 | 0.1023082 | 0.0000539 | 0.0000085 | -37.066 |
| 0.32753857 | 0.2371213 | 0.1251104 | 0.0000618 | 0.0000101 | -33.905 |
| 0.40531804 | 0.2813960 | 0.1431747 | 0.0000674 | 0.0000113 | -30.714 |
| 0.46420077 | 0.3130892 | 0.1552281 | 0.0000709 | 0.0000120 | -28.867 |
| 0.49798743 | 0.3299236 | 0.1609403 | 0.0000726 | 0.0000124 | -28.321 |
| 0.50358254 | 0.3313121 | 0.1607577 | 0.0000722 | 0.0000123 | -30.375 |
| 0.48164620 | 0.3184696 | 0.1557500 | 0.0000709 | 0.0000119 | -33.195 |
| 0.43609255 | 0.2937521 | 0.1468853 | 0.0000672 | 0.0000111 | -35.404 |
| 0.37324566 | 0.2600705 | 0.1347057 | 0.0000623 | 0.0000101 | -38.569 |
| 0.30130515 | 0.2209937 | 0.1199226 | 0.0000574 | 0.0000090 | -42.417 |
| 0.22908914 | 0.1803897 | 0.1035660 | 0.0000515 | 0.0000078 | -43.596 |
| 0.16400023 | 0.1413588 | 0.0863552 | 0.0000438 | 0.0000064 | -41.381 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 0.11086284 | 0.1058916 | 0.0687044 | 0.0000358 | 0.0000051 | -37.789 |
| 0.07193840 | 0.0753717 | 0.0513809 | 0.0000284 | 0.0000039 | -33.712 |
| 0.04714586 | 0.0508317 | 0.0356346 | 0.0000215 | 0.0000029 | -28.411 |
| 0.03431017 | 0.0327644 | 0.0226856 | 0.0000154 | 0.0000021 | -22.889 |
| 0.02995920 | 0.0211096 | 0.0133749 | 0.0000107 | 0.0000014 | -16.454 |
| 0.02992621 | 0.0148983 | 0.0076296 | 0.0000062 | 0.0000009 | -8.639 |
| 0.03000392 | 0.0120926 | 0.0043379 | 0.0000024 | 0.0000005 | -1.694 |
| 0.02717371 | 0.0104079 | 0.0022459 | 0.0000003 | 0.0000002 | 0.888 |
| 0.02071349 | 0.0085227 | 0.0010039 | 0.0000004 | 0.0000002 | 0.296 |
| 0.01182691 | 0.0061958 | 0.0008670 | 0.0000009 | 0.0000002 | -1.683 |
| 0.00279230 | 0.0040164 | 0.0020760 | 0.0000023 | 0.0000003 | -5.560 |
| -0.00353050 | 0.0033570 | 0.0047890 | 0.0000050 | 0.0000006 | -9.306 |
| -0.00456574 | 0.0056818 | 0.0088103 | 0.0000073 | 0.0000009 | -12.454 |
| 0.00140450 | 0.0119430 | 0.0136801 | 0.0000100 | 0.0000013 | -13.954 |
| 0.01479533 | 0.0220823 | 0.0188080 | 0.0000119 | 0.0000016 | -14.165 |
| 0.03468867 | 0.0350671 | 0.0237609 | 0.0000139 | 0.0000020 | -13.375 |
| 0.05884835 | 0.0491017 | 0.0282413 | 0.0000149 | 0.0000023 | -9.894 |
| 0.08352091 | 0.0616214 | 0.0315676 | 0.0000142 | 0.0000024 | -4.649 |
| 0.10406833 | 0.0699385 | 0.0328265 | 0.0000130 | 0.0000024 | -0.178 |
| 0.11613181 | 0.0721372 | 0.0314440 | 0.0000112 | 0.0000022 | 4.097 |
| 0.11614262 | 0.0670659 | 0.0270629 | 0.0000077 | 0.0000017 | 8.748 |
| 0.10168524 | 0.0540953 | 0.0193728 | 0.0000029 | 0.0000010 | 12.862 |
| 0.07208659 | 0.0332346 | 0.0083666 | -0.0000028 | 0.0000001 | 15.575 |
| 0.02877720 | 0.0053226 | -0.0054211 | -0.0000089 | -0.0000010 | 16.930 |
| -0.02488245 | -0.0279733 | -0.0210143 | -0.0000154 | -0.0000022 | 17.220 |
| -0.08402977 | -0.0641711 | -0.0371581 | -0.0000214 | -0.0000033 | 15.278 |
| -0.14258527 | -0.0997813 | -0.0522050 | -0.0000257 | -0.0000043 | 11.312 |
| -0.19387133 | -0.1305549 | -0.0642754 | -0.0000284 | -0.0000050 | 5.938 |
| -0.23159615 | -0.1522830 | -0.0717484 | -0.0000293 | -0.0000053 | 2.939 |
| -0.25138350 | -0.1622853 | -0.0741846 | -0.0000301 | -0.0000055 | 2.684 |
| -0.25140645 | -0.1600053 | -0.0722412 | -0.0000294 | -0.0000053 | 4.210 |
| -0.23242629 | -0.1468782 | -0.0670670 | -0.0000281 | -0.0000050 | 8.193 |
| -0.19792459 | -0.1261367 | -0.0600944 | -0.0000270 | -0.0000046 | 13.995 |
| -0.15361014 | -0.1019730 | -0.0526715 | -0.0000256 | -0.0000041 | 18.621 |
| -0.10608355 | -0.0780837 | -0.0454161 | -0.0000230 | -0.0000034 | 21.238 |
| -0.06172904 | -0.0568861 | -0.0382849 | -0.0000203 | -0.0000028 | 22.140 |
| -0.02588851 | -0.0395143 | -0.0311084 | -0.0000172 | -0.0000023 | 21.800 |
| -0.00221010 | -0.0262855 | -0.0240636 | -0.0000145 | -0.0000018 | 21.263 |
| 0.00771665 | -0.0173472 | -0.0178588 | -0.0000123 | -0.0000015 | 19.773 |
| 0.00466638 | -0.0128438 | -0.0133080 | -0.0000104 | -0.0000013 | 17.611 |
| -0.00859895 | -0.0129826 | -0.0110439 | -0.0000095 | -0.0000012 | 15.572 |
| -0.02821090 | -0.0179062 | -0.0114231 | -0.0000095 | -0.0000014 | 13.059 |
| -0.04997110 | -0.0271549 | -0.0142961 | -0.0000100 | -0.0000016 | 10.416 |
| -0.07010801 | -0.0393191 | -0.0189824 | -0.0000109 | -0.0000018 | 6.810 |
| -0.08564180 | -0.0519240 | -0.0242569 | -0.0000113 | -0.0000020 | 3.862 |
| -0.09492445 | -0.0622377 | -0.0289128 | -0.0000125 | -0.0000022 | 2.976 |
| -0.09788503 | -0.0683252 | -0.0322778 | -0.0000139 | -0.0000024 | 4.315 |
| -0.09576007 | -0.0697024 | -0.0342896 | -0.0000155 | -0.0000026 | 7.667 |
| -0.09066469 | -0.0675138 | -0.0353815 | -0.0000174 | -0.0000028 | 12.628 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| -0.08511785 | -0.0641224 | -0.0362559 | -0.0000195 | -0.0000030 | 17.048 |
| -0.08124417 | -0.0619107 | -0.0373206 | -0.0000205 | -0.0000031 | 18.728 |
| -0.08007842 | -0.0620391 | -0.0382965 | -0.0000204 | -0.0000031 | 17.726 |
| -0.08142818 | -0.0639957 | -0.0384392 | -0.0000193 | -0.0000029 | 13.784 |
| -0.08377012 | -0.0656348 | -0.0367473 | -0.0000162 | -0.0000026 | 7.128 |
| -0.08437814 | -0.0638433 | -0.0322250 | -0.0000118 | -0.0000021 | 0.222 |
| -0.07998975 | -0.0558286 | -0.0243781 | -0.0000066 | -0.0000014 | -6.952 |
| -0.06723925 | -0.0398641 | -0.0131505 | 0.0000002 | -0.0000004 | -12.983 |
| -0.04351693 | -0.0158912 | 0.0009582 | 0.0000068 | 0.0000006 | -16.513 |
| -0.00791161 | 0.0143444 | 0.0167970 | 0.0000133 | 0.0000017 | -18.140 |
| 0.03839878 | 0.0479583 | 0.0329170 | 0.0000197 | 0.0000028 | -18.294 |
| 0.09202155 | 0.0816712 | 0.0478579 | 0.0000251 | 0.0000039 | -16.401 |
| 0.14752104 | 0.1122859 | 0.0602604 | 0.0000289 | 0.0000047 | -14.524 |
| 0.19856666 | 0.1374271 | 0.0694135 | 0.0000324 | 0.0000055 | -13.491 |
| 0.23920385 | 0.1558181 | 0.0754336 | 0.0000348 | 0.0000060 | -13.615 |
| 0.26496770 | 0.1671434 | 0.0790229 | 0.0000366 | 0.0000063 | -14.778 |
| 0.27362252 | 0.1716814 | 0.0809685 | 0.0000376 | 0.0000065 | -15.984 |
| 0.26536021 | 0.1698683 | 0.0816104 | 0.0000376 | 0.0000064 | -17.759 |
| 0.24287181 | 0.1623738 | 0.0809144 | 0.0000377 | 0.0000062 | -20.938 |
| 0.21106843 | 0.1504278 | 0.0788713 | 0.0000377 | 0.0000060 | -25.414 |
| 0.17608956 | 0.1358182 | 0.0756245 | 0.0000374 | 0.0000058 | -28.660 |
| 0.14357676 | 0.1202298 | 0.0710614 | 0.0000354 | 0.0000053 | -29.152 |
| 0.11733041 | 0.1047597 | 0.0647460 | 0.0000321 | 0.0000048 | -27.560 |
| 0.09888800 | 0.0899767 | 0.0564261 | 0.0000280 | 0.0000041 | -24.146 |
| 0.08752707 | 0.0759839 | 0.0463402 | 0.0000228 | 0.0000034 | -19.205 |
| 0.08067451 | 0.0625109 | 0.0352060 | 0.0000172 | 0.0000026 | -13.646 |
| 0.07479971 | 0.0491996 | 0.0240832 | 0.0000117 | 0.0000019 | -8.679 |
| 0.06653866 | 0.0359467 | 0.0141460 | 0.0000070 | 0.0000012 | -4.891 |
| 0.05359893 | 0.0229929 | 0.0062975 | 0.0000033 | 0.0000007 | -2.117 |
| 0.03521231 | 0.0107039 | 0.0007779 | 0.0000004 | 0.0000002 | 0.070 |
| 0.01225313 | -0.0006523 | -0.0028782 | -0.0000017 | -0.0000002 | 0.463 |
| -0.01272397 | -0.0107385 | -0.0053094 | -0.0000025 | -0.0000005 | -0.327 |
| -0.03623711 | -0.0192959 | -0.0071449 | -0.0000033 | -0.0000007 | -0.251 |
| -0.05514510 | -0.0264859 | -0.0091465 | -0.0000048 | -0.0000010 | 0.382 |
| -0.06738293 | -0.0326607 | -0.0119095 | -0.0000061 | -0.0000012 | 1.720 |
| -0.07239584 | -0.0380993 | -0.0156326 | -0.0000081 | -0.0000015 | 3.256 |
| -0.07110568 | -0.0427680 | -0.0199783 | -0.0000098 | -0.0000017 | 4.853 |
| -0.06564655 | -0.0464041 | -0.0242677 | -0.0000117 | -0.0000019 | 7.648 |
| -0.05908203 | -0.0490083 | -0.0280214 | -0.0000142 | -0.0000022 | 11.262 |
| -0.05467136 | -0.0510370 | -0.0311242 | -0.0000164 | -0.0000024 | 14.952 |
| -0.05509234 | -0.0533854 | -0.0337835 | -0.0000187 | -0.0000027 | 18.985 |
| -0.06205851 | -0.0573557 | -0.0365530 | -0.0000213 | -0.0000031 | 22.404 |
| -0.07595045 | -0.0641628 | -0.0400068 | -0.0000236 | -0.0000034 | 23.941 |
| -0.09565694 | -0.0742875 | -0.0443534 | -0.0000254 | -0.0000038 | 24.075 |
| -0.11894298 | -0.0872394 | -0.0494307 | -0.0000273 | -0.0000042 | 22.292 |
| -0.14277886 | -0.1014159 | -0.0546375 | -0.0000281 | -0.0000045 | 19.312 |
| -0.16384940 | -0.1144293 | -0.0590993 | -0.0000286 | -0.0000047 | 15.634 |
| -0.17903672 | -0.1236889 | -0.0618880 | -0.0000283 | -0.0000048 | 12.536 |
| -0.18601351 | -0.1272367 | -0.0624055 | -0.0000277 | -0.0000047 | 11.367 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| -0.18369889 | -0.1243905 | -0.0606297 | -0.0000269 | -0.0000046 | 11.012 |
| -0.17218567 | -0.1156629 | -0.0568568 | -0.0000253 | -0.0000043 | 12.355 |
| -0.15294338 | -0.1027433 | -0.0517847 | -0.0000244 | -0.0000040 | 15.220 |
| -0.12873488 | -0.0880957 | -0.0464102 | -0.0000233 | -0.0000037 | 18.368 |
| -0.10303835 | -0.0741491 | -0.0415968 | -0.0000221 | -0.0000033 | 20.205 |
| -0.07928497 | -0.0625542 | -0.0376910 | -0.0000206 | -0.0000030 | 21.067 |
| -0.06049160 | -0.0541449 | -0.0347244 | -0.0000196 | -0.0000028 | 21.829 |
| -0.04903451 | -0.0492735 | -0.0327732 | -0.0000192 | -0.0000027 | 22.223 |
| -0.04621058 | -0.0479640 | -0.0319484 | -0.0000190 | -0.0000027 | 21.822 |
| -0.05181910 | -0.0498854 | -0.0321723 | -0.0000188 | -0.0000027 | 19.508 |
| -0.06389813 | -0.0541279 | -0.0329030 | -0.0000178 | -0.0000027 | 15.614 |
| -0.07909367 | -0.0592655 | -0.0333189 | -0.0000166 | -0.0000026 | 11.211 |
| -0.09338825 | -0.0635769 | -0.0326854 | -0.0000149 | -0.0000025 | 5.873 |
| -0.10266496 | -0.0651010 | -0.0304048 | -0.0000121 | -0.0000022 | 1.046 |
| -0.10358451 | -0.0621544 | -0.0262837 | -0.0000094 | -0.0000019 | -2.388 |
| -0.09426317 | -0.0538377 | -0.0205910 | -0.0000064 | -0.0000014 | -4.305 |
| -0.07447245 | -0.0401924 | -0.0137718 | -0.0000032 | -0.0000008 | -5.804 |
| -0.04533406 | -0.0219037 | -0.0059774 | 0.0000008 | -0.0000001 | -7.463 |
| -0.00887112 | 0.0001142 | 0.0031129 | 0.0000056 | 0.0000007 | -10.510 |
| 0.03262079 | 0.0252292 | 0.0142439 | 0.0000119 | 0.0000017 | -14.690 |
| 0.07686555 | 0.0530978 | 0.0280171 | 0.0000189 | 0.0000029 | -18.385 |
| 0.12152550 | 0.0831274 | 0.0441235 | 0.0000259 | 0.0000041 | -20.757 |
| 0.16423360 | 0.1140149 | 0.0611520 | 0.0000325 | 0.0000052 | -21.840 |
| 0.20271893 | 0.1435797 | 0.0770022 | 0.0000380 | 0.0000062 | -21.185 |
| 0.23470280 | 0.1687778 | 0.0894012 | 0.0000414 | 0.0000068 | -18.928 |
| 0.25781111 | 0.1861674 | 0.0964703 | 0.0000425 | 0.0000071 | -15.886 |
| 0.26966979 | 0.1927822 | 0.0972059 | 0.0000413 | 0.0000070 | -12.793 |
| 0.26812077 | 0.1869734 | 0.0916252 | 0.0000379 | 0.0000065 | -10.059 |
| 0.25158563 | 0.1688928 | 0.0806055 | 0.0000328 | 0.0000057 | -8.345 |
| 0.21969815 | 0.1405970 | 0.0656975 | 0.0000268 | 0.0000047 | -8.441 |
| 0.17400848 | 0.1057363 | 0.0489514 | 0.0000209 | 0.0000036 | -10.207 |
| 0.11827726 | 0.0687532 | 0.0325441 | 0.0000155 | 0.0000025 | -12.832 |
| 0.05816731 | 0.0338661 | 0.0182692 | 0.0000107 | 0.0000015 | -15.035 |
| 0.00037936 | 0.0042137 | 0.0071006 | 0.0000066 | 0.0000007 | -16.339 |
| -0.04844464 | -0.0184635 | -0.0008681 | 0.0000034 | -0.0000000 | -16.078 |
| -0.08302836 | -0.0338240 | -0.0063111 | 0.0000005 | -0.0000005 | -13.590 |
| -0.10059263 | -0.0426552 | -0.0103577 | -0.0000024 | -0.0000010 | -10.020 |
| -0.10122762 | -0.0462070 | -0.0139312 | -0.0000046 | -0.0000012 | -5.547 |
| -0.08786804 | -0.0458210 | -0.0174426 | -0.0000071 | -0.0000014 | -0.339 |
| -0.06572209 | -0.0427987 | -0.0207951 | -0.0000094 | -0.0000016 | 4.839 |
| -0.04112182 | -0.0383248 | -0.0235159 | -0.0000114 | -0.0000017 | 9.699 |
| -0.02020235 | -0.0335141 | -0.0250716 | -0.0000128 | -0.0000017 | 13.184 |
| -0.00754100 | -0.0293115 | -0.0250624 | -0.0000132 | -0.0000017 | 14.944 |
| -0.00535448 | -0.0265017 | -0.0234922 | -0.0000130 | -0.0000017 | 15.856 |
| -0.01347344 | -0.0258598 | -0.0210414 | -0.0000127 | -0.0000017 | 15.572 |
| -0.02962721 | -0.0279757 | -0.0188236 | -0.0000121 | -0.0000017 | 14.556 |
| -0.05028444 | -0.0331661 | -0.0180707 | -0.0000122 | -0.0000018 | 13.897 |
| -0.07178043 | -0.0414834 | -0.0198338 | -0.0000133 | -0.0000021 | 13.153 |
| -0.09105593 | -0.0524607 | -0.0244635 | -0.0000149 | -0.0000024 | 12.546 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| -0.10621959 | -0.0650705 | -0.0314459 | -0.0000174 | -0.0000029 | 12.551 |
| -0.11680422 | -0.0779215 | -0.0396245 | -0.0000204 | -0.0000033 | 13.045 |
| -0.12348928 | -0.0894571 | -0.0475066 | -0.0000231 | -0.0000037 | 13.555 |
| -0.12745638 | -0.0981583 | -0.0535851 | -0.0000250 | -0.0000040 | 13.835 |
| -0.12973047 | -0.1028227 | -0.0567023 | -0.0000258 | -0.0000041 | 13.818 |
| -0.13073640 | -0.1028517 | -0.0563594 | -0.0000254 | -0.0000041 | 13.800 |
| -0.13019704 | -0.0984434 | -0.0528671 | -0.0000242 | -0.0000039 | 13.579 |
| -0.12723922 | -0.0904748 | -0.0471544 | -0.0000220 | -0.0000036 | 13.060 |
| -0.12074450 | -0.0801999 | -0.0404130 | -0.0000193 | -0.0000032 | 12.204 |
| -0.10981375 | -0.0688675 | -0.0337145 | -0.0000165 | -0.0000027 | 10.860 |
| -0.09408899 | -0.0572964 | -0.0276448 | -0.0000134 | -0.0000022 | 8.265 |
| -0.07373073 | -0.0454663 | -0.0220007 | -0.0000096 | -0.0000016 | 4.294 |
| -0.04939532 | -0.0326010 | -0.0159775 | -0.0000055 | -0.0000010 | 1.117 |
| -0.02255803 | -0.0180391 | -0.0090199 | -0.0000022 | -0.0000004 | 0.059 |
| 0.00450945 | -0.0019731 | -0.0013417 | 0.0000006 | 0.0000001 | 0.269 |
| 0.02935868 | 0.0145132 | 0.0063319 | 0.0000032 | 0.0000006 | 0.970 |
| 0.04994257 | 0.0297374 | 0.0131851 | 0.0000054 | 0.0000011 | 1.469 |
| 0.06493607 | 0.0419074 | 0.0186082 | 0.0000073 | 0.0000014 | 1.433 |
| 0.07373545 | 0.0496010 | 0.0222404 | 0.0000085 | 0.0000016 | 1.429 |
| 0.07618847 | 0.0520157 | 0.0237930 | 0.0000087 | 0.0000016 | 1.190 |
| 0.07252864 | 0.0492020 | 0.0231143 | 0.0000085 | 0.0000016 | 0.362 |
| 0.06345544 | 0.0421099 | 0.0203808 | 0.0000077 | 0.0000014 | -1.172 |
| 0.05014782 | 0.0323062 | 0.0161503 | 0.0000066 | 0.0000011 | -2.294 |
| 0.03399249 | 0.0213316 | 0.0110695 | 0.0000046 | 0.0000008 | -2.530 |
| 0.01653592 | 0.0104104 | 0.0057944 | 0.0000028 | 0.0000004 | -4.210 |
| -0.00004218 | 0.0009178 | 0.0014020 | 0.0000025 | 0.0000002 | -7.168 |
| -0.01315329 | -0.0056483 | -0.0009176 | 0.0000026 | 0.0000002 | -9.305 |
| -0.02065791 | -0.0082569 | -0.0006863 | 0.0000030 | 0.0000002 | -9.855 |
| -0.02140051 | -0.0066613 | 0.0016139 | 0.0000036 | 0.0000003 | -9.340 |
| -0.01532290 | -0.0013835 | 0.0049232 | 0.0000044 | 0.0000005 | -7.376 |
| -0.00357477 | 0.0062633 | 0.0080125 | 0.0000045 | 0.0000006 | -4.760 |
| 0.01173631 | 0.0145259 | 0.0100267 | 0.0000046 | 0.0000007 | -2.390 |
| 0.02789958 | 0.0216659 | 0.0107320 | 0.0000043 | 0.0000008 | 0.657 |
| 0.04176082 | 0.0261256 | 0.0101827 | 0.0000031 | 0.0000007 | 3.103 |
| 0.05049854 | 0.0271034 | 0.0087557 | 0.0000026 | 0.0000007 | 3.141 |
| 0.05255305 | 0.0250351 | 0.0072555 | 0.0000027 | 0.0000007 | 1.795 |
| 0.04778525 | 0.0211463 | 0.0063951 | 0.0000028 | 0.0000006 | 0.194 |
| 0.03733545 | 0.0167544 | 0.0063757 | 0.0000032 | 0.0000006 | -1.741 |
| 0.02359292 | 0.0129859 | 0.0070728 | 0.0000041 | 0.0000006 | -5.053 |
| 0.00987554 | 0.0106732 | 0.0083316 | 0.0000053 | 0.0000007 | -5.822 |
| -0.00099701 | 0.0096035 | 0.0094308 | 0.0000046 | 0.0000006 | -5.643 |
| -0.00709064 | 0.0090605 | 0.0096422 | 0.0000048 | 0.0000006 | -5.664 |
| -0.00751401 | 0.0085228 | 0.0087607 | 0.0000044 | 0.0000005 | -4.996 |
| -0.00280628 | 0.0077413 | 0.0069395 | 0.0000035 | 0.0000004 | -3.581 |
| 0.00513371 | 0.0067023 | 0.0044997 | 0.0000022 | 0.0000003 | -1.554 |
| 0.01355677 | 0.0055006 | 0.0018128 | 0.0000007 | 0.0000002 | 0.670 |
| 0.01961906 | 0.0041752 | -0.0007561 | -0.0000008 | 0.0000000 | 2.772 |
| 0.02101730 | 0.0024809 | -0.0029964 | -0.0000024 | -0.0000002 | 5.748 |
| 0.01623045 | -0.0003805 | -0.0051389 | -0.0000046 | -0.0000005 | 8.264 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 0.00495253 | -0.0053497 | -0.0075845 | -0.0000062 | -0.0000008 | 9.785 |
| -0.01191836 | -0.0131125 | -0.0107282 | -0.0000082 | -0.0000011 | 11.385 |
| -0.03282047 | -0.0240107 | -0.0150419 | -0.0000107 | -0.0000016 | 12.113 |
| -0.05571526 | -0.0376314 | -0.0206908 | -0.0000128 | -0.0000020 | 11.376 |
| -0.07831781 | -0.0526710 | -0.0272839 | -0.0000149 | -0.0000024 | 10.779 |
| -0.09871105 | -0.0674896 | -0.0342071 | -0.0000176 | -0.0000029 | 10.657 |
| -0.11554472 | -0.0805043 | -0.0407526 | -0.0000198 | -0.0000033 | 10.181 |
| -0.12784566 | -0.0903095 | -0.0460535 | -0.0000213 | -0.0000035 | 10.140 |
| -0.13508818 | -0.0960279 | -0.0493973 | -0.0000226 | -0.0000037 | 10.541 |
| -0.13714295 | -0.0974109 | -0.0504192 | -0.0000228 | -0.0000038 | 10.869 |
| -0.13417939 | -0.0947432 | -0.0491495 | -0.0000224 | -0.0000037 | 12.109 |
| -0.12698938 | -0.0890531 | -0.0463015 | -0.0000223 | -0.0000036 | 15.523 |
| -0.11726878 | -0.0822166 | -0.0433051 | -0.0000229 | -0.0000036 | 18.940 |
| -0.10709687 | -0.0762444 | -0.0414719 | -0.0000230 | -0.0000035 | 21.827 |
| -0.09857925 | -0.0727659 | -0.0414871 | -0.0000238 | -0.0000036 | 23.799 |
| -0.09341807 | -0.0725474 | -0.0431593 | -0.0000242 | -0.0000036 | 22.387 |
| -0.09208432 | -0.0747950 | -0.0451496 | -0.0000231 | -0.0000035 | 18.500 |
| -0.09371452 | -0.0774114 | -0.0456415 | -0.0000214 | -0.0000033 | 13.160 |
| -0.09621546 | -0.0776324 | -0.0431024 | -0.0000180 | -0.0000029 | 6.138 |
| -0.09641022 | -0.0726948 | -0.0366601 | -0.0000131 | -0.0000023 | 0.497 |
| -0.09106494 | -0.0611150 | -0.0267301 | -0.0000086 | -0.0000017 | -2.864 |
| -0.07771997 | -0.0432737 | -0.0148414 | -0.0000037 | -0.0000009 | -4.491 |
| -0.05517395 | -0.0211049 | -0.0028300 | 0.0000008 | -0.0000002 | -4.942 |
| -0.02384172 | 0.0026800 | 0.0078982 | 0.0000049 | 0.0000006 | -5.199 |
| 0.01414953 | 0.0255421 | 0.0167617 | 0.0000087 | 0.0000013 | -5.010 |
| 0.05502462 | 0.0456604 | 0.0238008 | 0.0000115 | 0.0000019 | -4.702 |
| 0.09401617 | 0.0622199 | 0.0294230 | 0.0000141 | 0.0000025 | -5.195 |
| 0.12656933 | 0.0754623 | 0.0343212 | 0.0000169 | 0.0000030 | -7.277 |
| 0.14967239 | 0.0864814 | 0.0394574 | 0.0000204 | 0.0000035 | -12.063 |
| 0.16290455 | 0.0969191 | 0.0460094 | 0.0000253 | 0.0000042 | -18.476 |
| 0.16840800 | 0.1082553 | 0.0547926 | 0.0000305 | 0.0000049 | -24.701 |
| 0.17006979 | 0.1211943 | 0.0656840 | 0.0000361 | 0.0000056 | -30.678 |
| 0.17253178 | 0.1356632 | 0.0776790 | 0.0000418 | 0.0000064 | -34.870 |
| 0.17977089 | 0.1508194 | 0.0890744 | 0.0000462 | 0.0000070 | -37.376 |
| 0.19403677 | 0.1654039 | 0.0981034 | 0.0000497 | 0.0000076 | -37.997 |
| 0.21515051 | 0.1780399 | 0.1035012 | 0.0000512 | 0.0000079 | -36.604 |
| 0.24037948 | 0.1874374 | 0.1048195 | 0.0000511 | 0.0000080 | -34.022 |
| 0.26511614 | 0.1926735 | 0.1025643 | 0.0000497 | 0.0000080 | -30.960 |
| 0.28403631 | 0.1933503 | 0.0979734 | 0.0000474 | 0.0000078 | -28.251 |
| 0.29241325 | 0.1895821 | 0.0925163 | 0.0000448 | 0.0000075 | -25.575 |
| 0.28708783 | 0.1816621 | 0.0871830 | 0.0000417 | 0.0000070 | -23.102 |
| 0.26713763 | 0.1698085 | 0.0821191 | 0.0000387 | 0.0000065 | -20.843 |
| 0.23401670 | 0.1540299 | 0.0766583 | 0.0000351 | 0.0000058 | -18.742 |
| 0.19112996 | 0.1341680 | 0.0696817 | 0.0000309 | 0.0000050 | -16.797 |
| 0.14298933 | 0.1101344 | 0.0601398 | 0.0000259 | 0.0000041 | -14.772 |
| 0.09413278 | 0.0821860 | 0.0474686 | 0.0000198 | 0.0000030 | -12.244 |
| 0.04813211 | 0.0511275 | 0.0317907 | 0.0000127 | 0.0000019 | -9.324 |
| 0.00710052 | 0.0184685 | 0.0140073 | 0.0000051 | 0.0000006 | -6.407 |
| -0.02823715 | -0.0135987 | -0.0042772 | -0.0000022 | -0.0000006 | -3.785 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| -0.05814568 | -0.0425670 | -0.0211220 | -0.0000089 | -0.0000016 | -0.625 |
| -0.08352366 | -0.0663991 | -0.0349555 | -0.0000151 | -0.0000025 | 3.563 |
| -0.10541447 | -0.0841300 | -0.0450387 | -0.0000201 | -0.0000033 | 7.526 |
| -0.12427551 | -0.0957903 | -0.0512989 | -0.0000233 | -0.0000038 | 10.393 |
| -0.13960235 | -0.1020476 | -0.0540498 | -0.0000248 | -0.0000041 | 11.786 |
| -0.15013009 | -0.1038475 | -0.0538685 | -0.0000249 | -0.0000041 | 12.858 |
| -0.15464990 | -0.1023624 | -0.0517668 | -0.0000248 | -0.0000041 | 14.619 |
| -0.15280708 | -0.0989565 | -0.0491627 | -0.0000247 | -0.0000040 | 16.798 |
| -0.14534329 | -0.0948941 | -0.0473625 | -0.0000247 | -0.0000040 | 18.442 |
| -0.13388903 | -0.0910071 | -0.0469560 | -0.0000246 | -0.0000039 | 19.682 |
| -0.12073258 | -0.0877174 | -0.0477366 | -0.0000250 | -0.0000039 | 20.739 |
| -0.10845160 | -0.0851845 | -0.0489891 | -0.0000254 | -0.0000039 | 21.501 |
| -0.09936889 | -0.0833901 | -0.0498734 | -0.0000256 | -0.0000038 | 21.870 |
| -0.09505109 | -0.0822298 | -0.0498076 | -0.0000256 | -0.0000038 | 22.043 |
| -0.09603870 | -0.0816633 | -0.0487447 | -0.0000254 | -0.0000038 | 22.020 |
| -0.10180552 | -0.0818106 | -0.0471790 | -0.0000251 | -0.0000038 | 22.073 |
| -0.11103244 | -0.0830246 | -0.0459769 | -0.0000251 | -0.0000039 | 22.437 |
| -0.12208702 | -0.0858644 | -0.0460907 | -0.0000258 | -0.0000040 | 23.338 |
| -0.13356495 | -0.0909566 | -0.0482689 | -0.0000274 | -0.0000043 | 24.795 |
| -0.14457961 | -0.0986408 | -0.0527222 | -0.0000295 | -0.0000046 | 24.804 |
| -0.15435708 | -0.1081841 | -0.0585599 | -0.0000306 | -0.0000048 | 21.931 |
| -0.16179331 | -0.1173926 | -0.0637623 | -0.0000304 | -0.0000049 | 17.518 |
| -0.16548430 | -0.1231646 | -0.0660228 | -0.0000290 | -0.0000048 | 11.574 |
| -0.16355902 | -0.1221623 | -0.0634188 | -0.0000251 | -0.0000043 | 5.086 |
| -0.15384654 | -0.1118134 | -0.0550566 | -0.0000198 | -0.0000035 | 0.297 |
| -0.13452465 | -0.0914170 | -0.0415622 | -0.0000138 | -0.0000026 | -2.785 |
| -0.10457388 | -0.0624019 | -0.0247408 | -0.0000069 | -0.0000015 | -3.859 |
| -0.06431106 | -0.0279952 | -0.0069562 | -0.0000005 | -0.0000004 | -3.797 |
| -0.01566760 | 0.0077533 | 0.0096561 | 0.0000057 | 0.0000008 | -3.410 |
| 0.03776255 | 0.0410622 | 0.0236978 | 0.0000110 | 0.0000018 | -2.762 |
| 0.09090649 | 0.0691196 | 0.0345251 | 0.0000151 | 0.0000026 | -2.009 |
| 0.13791557 | 0.0903984 | 0.0421078 | 0.0000181 | 0.0000033 | -2.091 |
| 0.17341141 | 0.1046997 | 0.0469740 | 0.0000205 | 0.0000038 | -3.297 |
| 0.19363416 | 0.1127103 | 0.0499438 | 0.0000222 | 0.0000040 | -4.737 |
| 0.19711210 | 0.1152810 | 0.0516708 | 0.0000231 | 0.0000041 | -6.988 |
| 0.18515326 | 0.1132287 | 0.0525978 | 0.0000241 | 0.0000042 | -10.561 |
| 0.16169594 | 0.1074084 | 0.0529845 | 0.0000249 | 0.0000041 | -14.066 |
| 0.13218524 | 0.0985883 | 0.0526429 | 0.0000250 | 0.0000039 | -16.840 |
| 0.10232580 | 0.0875803 | 0.0510407 | 0.0000246 | 0.0000037 | -19.627 |
| 0.07722974 | 0.0756756 | 0.0479086 | 0.0000242 | 0.0000035 | -22.756 |
| 0.06074499 | 0.0647929 | 0.0436876 | 0.0000237 | 0.0000033 | -25.643 |
| 0.05489633 | 0.0570962 | 0.0394450 | 0.0000232 | 0.0000032 | -27.203 |
| 0.05962648 | 0.0543173 | 0.0364099 | 0.0000227 | 0.0000032 | -27.171 |
| 0.07310455 | 0.0572716 | 0.0355741 | 0.0000226 | 0.0000033 | -25.959 |
| 0.09238563 | 0.0656516 | 0.0374210 | 0.0000230 | 0.0000035 | -23.277 |
| 0.11405672 | 0.0780060 | 0.0417138 | 0.0000238 | 0.0000037 | -21.035 |
| 0.13517303 | 0.0923660 | 0.0478308 | 0.0000260 | 0.0000041 | -19.775 |
| 0.15376142 | 0.1068041 | 0.0549886 | 0.0000285 | 0.0000046 | -20.039 |
| 0.16896920 | 0.1198839 | 0.0624135 | 0.0000317 | 0.0000051 | -21.397 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 0.18077882 | 0.1307501 | 0.0693298 | 0.0000346 | 0.0000055 | -22.727 |
| 0.18950671 | 0.1389350 | 0.0749078 | 0.0000368 | 0.0000059 | -24.147 |
| 0.19554806 | 0.1442849 | 0.0785071 | 0.0000384 | 0.0000061 | -24.997 |
| 0.19900410 | 0.1466629 | 0.0797085 | 0.0000384 | 0.0000061 | -23.895 |
| 0.19921208 | 0.1455010 | 0.0780863 | 0.0000364 | 0.0000059 | -20.487 |
| 0.19470199 | 0.1397675 | 0.0732210 | 0.0000328 | 0.0000054 | -16.213 |
| 0.18378382 | 0.1285506 | 0.0651119 | 0.0000283 | 0.0000047 | -12.673 |
| 0.16534753 | 0.1117889 | 0.0545246 | 0.0000237 | 0.0000040 | -11.297 |
| 0.13953425 | 0.0907382 | 0.0429767 | 0.0000196 | 0.0000033 | -11.583 |
| 0.10784647 | 0.0677130 | 0.0321379 | 0.0000159 | 0.0000026 | -12.691 |
| 0.07298673 | 0.0454663 | 0.0232325 | 0.0000129 | 0.0000020 | -14.379 |
| 0.03857351 | 0.0265402 | 0.0168076 | 0.0000108 | 0.0000015 | -15.230 |
| 0.00847229 | 0.0125487 | 0.0126533 | 0.0000090 | 0.0000011 | -15.702 |
| -0.01374174 | 0.0040475 | 0.0102207 | 0.0000081 | 0.0000009 | -15.258 |
| -0.02559196 | 0.0005398 | 0.0088453 | 0.0000069 | 0.0000007 | -13.101 |
| -0.02644271 | 0.0006978 | 0.0078313 | 0.0000056 | 0.0000006 | -10.452 |
| -0.01753437 | 0.0030771 | 0.0068001 | 0.0000047 | 0.0000005 | -7.534 |
| -0.00180120 | 0.0065137 | 0.0056973 | 0.0000036 | 0.0000005 | -4.023 |
| 0.01656166 | 0.0101177 | 0.0045600 | 0.0000023 | 0.0000004 | -0.532 |
| 0.03307189 | 0.0132907 | 0.0035207 | 0.0000014 | 0.0000004 | 1.635 |
| 0.04411672 | 0.0157510 | 0.0029077 | 0.0000010 | 0.0000004 | 3.152 |
| 0.04746229 | 0.0171300 | 0.0028762 | 0.0000004 | 0.0000003 | 4.837 |
| 0.04233444 | 0.0166521 | 0.0030532 | -0.0000005 | 0.0000002 | 6.476 |
| 0.02938126 | 0.0133026 | 0.0026334 | -0.0000016 | -0.0000000 | 7.729 |
| 0.01043843 | 0.0062840 | 0.0007570 | -0.0000030 | -0.0000003 | 7.746 |
| -0.01180094 | -0.0044155 | -0.0029868 | -0.0000044 | -0.0000006 | 6.555 |
| -0.03437695 | -0.0178288 | -0.0083906 | -0.0000060 | -0.0000010 | 5.199 |
| -0.05482143 | -0.0323527 | -0.0148780 | -0.0000083 | -0.0000014 | 4.808 |
| -0.07167987 | -0.0463028 | -0.0218145 | -0.0000110 | -0.0000019 | 5.253 |
| -0.08447528 | -0.0582603 | -0.0285350 | -0.0000136 | -0.0000023 | 6.337 |
| -0.09343723 | -0.0673179 | -0.0343640 | -0.0000161 | -0.0000027 | 7.968 |
| -0.09925082 | -0.0732562 | -0.0387821 | -0.0000183 | -0.0000030 | 10.523 |
| -0.10296976 | -0.0766651 | -0.0417274 | -0.0000205 | -0.0000032 | 14.167 |
| -0.10594677 | -0.0788454 | -0.0437391 | -0.0000228 | -0.0000035 | 18.417 |
| -0.10968314 | -0.0814682 | -0.0457902 | -0.0000252 | -0.0000038 | 23.157 |
| -0.11572956 | -0.0862321 | -0.0490021 | -0.0000283 | -0.0000043 | 27.590 |
| -0.12544178 | -0.0944217 | -0.0541869 | -0.0000316 | -0.0000047 | 31.146 |
| -0.13971235 | -0.1065551 | -0.0615053 | -0.0000353 | -0.0000053 | 33.273 |
| -0.15869894 | -0.1221731 | -0.0703537 | -0.0000388 | -0.0000059 | 33.880 |
| -0.18165421 | -0.1398757 | -0.0795572 | -0.0000420 | -0.0000065 | 33.064 |
| -0.20682175 | -0.1575244 | -0.0876942 | -0.0000443 | -0.0000069 | 30.542 |
| -0.23131274 | -0.1724402 | -0.0932988 | -0.0000448 | -0.0000072 | 25.894 |
| -0.25117046 | -0.1816900 | -0.0950204 | -0.0000432 | -0.0000071 | 20.351 |
| -0.26197923 | -0.1827122 | -0.0920023 | -0.0000400 | -0.0000068 | 14.287 |
| -0.25959185 | -0.1737982 | -0.0840393 | -0.0000348 | -0.0000061 | 9.261 |
| -0.24121084 | -0.1546780 | -0.0718112 | -0.0000291 | -0.0000052 | 6.959 |
| -0.20637387 | -0.1268532 | -0.0568925 | -0.0000232 | -0.0000042 | 6.395 |
| -0.15709282 | -0.0930822 | -0.0410687 | -0.0000170 | -0.0000030 | 6.872 |
| -0.09764480 | -0.0567085 | -0.0257769 | -0.0000112 | -0.0000019 | 8.321 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| -0.03418091 | -0.0211825 | -0.0120099 | -0.0000063 | -0.0000008 | 10.682 |
| 0.02603879 | 0.0103152 | -0.0004371 | -0.0000026 | 0.0000000 | 13.042 |
| 0.07592035 | 0.0353248 | 0.0086083 | 0.0000005 | 0.0000007 | 13.979 |
| 0.10997903 | 0.0524885 | 0.0152098 | 0.0000032 | 0.0000012 | 13.268 |
| 0.12526262 | 0.0614697 | 0.0196414 | 0.0000051 | 0.0000015 | 11.699 |
| 0.12157131 | 0.0625248 | 0.0219596 | 0.0000060 | 0.0000015 | 9.921 |
| 0.10130918 | 0.0562670 | 0.0219338 | 0.0000060 | 0.0000014 | 6.530 |
| 0.06933493 | 0.0440227 | 0.0195986 | 0.0000062 | 0.0000012 | 1.391 |
| 0.03202194 | 0.0278284 | 0.0153873 | 0.0000056 | 0.0000009 | -1.887 |
| -0.00450008 | 0.0097448 | 0.0095950 | 0.0000034 | 0.0000004 | -5.475 |
| -0.03485391 | -0.0077650 | 0.0029565 | 0.0000027 | 0.0000001 | -9.534 |
| -0.05498096 | -0.0219337 | -0.0032528 | 0.0000015 | -0.0000002 | -11.594 |
| -0.06298276 | -0.0305614 | -0.0078905 | 0.0000002 | -0.0000004 | -12.156 |
| -0.05905374 | -0.0323855 | -0.0101295 | -0.0000002 | -0.0000004 | -11.036 |
| -0.04513387 | -0.0273656 | -0.0096280 | -0.0000005 | -0.0000004 | -8.463 |
| -0.02434616 | -0.0167071 | -0.0065869 | 0.0000001 | -0.0000001 | -5.403 |
| -0.00024314 | -0.0024748 | -0.0015810 | 0.0000013 | 0.0000002 | -2.648 |
| 0.02382346 | 0.0129383 | 0.0046072 | 0.0000030 | 0.0000006 | -0.544 |
| 0.04511703 | 0.0273221 | 0.0111093 | 0.0000050 | 0.0000010 | 0.108 |
| 0.06182213 | 0.0391171 | 0.0171616 | 0.0000074 | 0.0000014 | 0.028 |
| 0.07294192 | 0.0474239 | 0.0220547 | 0.0000091 | 0.0000017 | -0.549 |
| 0.07820880 | 0.0519358 | 0.0252278 | 0.0000104 | 0.0000018 | -1.813 |
| 0.07802635 | 0.0528504 | 0.0264472 | 0.0000111 | 0.0000019 | -2.808 |
| 0.07314480 | 0.0505316 | 0.0257044 | 0.0000107 | 0.0000018 | -3.264 |
| 0.06444738 | 0.0453552 | 0.0231706 | 0.0000096 | 0.0000016 | -3.457 |
| 0.05288009 | 0.0377641 | 0.0192144 | 0.0000080 | 0.0000013 | -3.225 |
| 0.03928029 | 0.0282355 | 0.0142433 | 0.0000057 | 0.0000009 | -1.932 |
| 0.02415257 | 0.0171383 | 0.0084660 | 0.0000026 | 0.0000005 | 0.056 |
| 0.00775545 | 0.0048044 | 0.0019727 | -0.0000006 | -0.0000001 | 1.938 |
| -0.00964446 | -0.0083129 | -0.0050340 | -0.0000038 | -0.0000006 | 3.696 |
| -0.02766262 | -0.0216579 | -0.0121987 | -0.0000070 | -0.0000011 | 5.046 |
| -0.04567048 | -0.0345538 | -0.0190038 | -0.0000098 | -0.0000016 | 5.607 |
| -0.06262396 | -0.0460903 | -0.0247460 | -0.0000116 | -0.0000019 | 4.524 |
| -0.07693609 | -0.0550126 | -0.0285554 | -0.0000121 | -0.0000021 | 2.942 |
| -0.08688981 | -0.0601293 | -0.0298649 | -0.0000122 | -0.0000021 | 1.993 |
| -0.09110973 | -0.0607607 | -0.0287385 | -0.0000115 | -0.0000021 | 1.211 |
| -0.08866024 | -0.0567675 | -0.0256295 | -0.0000099 | -0.0000018 | 0.451 |
| -0.07915120 | -0.0485060 | -0.0210751 | -0.0000079 | -0.0000015 | -0.162 |
| -0.06290192 | -0.0367662 | -0.0155349 | -0.0000054 | -0.0000010 | -0.633 |
| -0.04100809 | -0.0226018 | -0.0093300 | -0.0000027 | -0.0000006 | -1.035 |
| -0.01526433 | -0.0071157 | -0.0026704 | 0.0000002 | -0.0000000 | -1.419 |
| 0.01206119 | 0.0087103 | 0.0042706 | 0.0000032 | 0.0000005 | -2.040 |
| 0.03860404 | 0.0241231 | 0.0113259 | 0.0000063 | 0.0000011 | -2.971 |
| 0.06226249 | 0.0385467 | 0.0182815 | 0.0000093 | 0.0000016 | -3.820 |
| 0.08138439 | 0.0513657 | 0.0247604 | 0.0000118 | 0.0000020 | -4.208 |
| 0.09482369 | 0.0617399 | 0.0301686 | 0.0000136 | 0.0000024 | -3.933 |
| 0.10188879 | 0.0685715 | 0.0337488 | 0.0000142 | 0.0000025 | -2.747 |
| 0.10219651 | 0.0706312 | 0.0347055 | 0.0000136 | 0.0000024 | -1.099 |
| 0.09564288 | 0.0669453 | 0.0324949 | 0.0000118 | 0.0000021 | 0.364 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 0.08242405 | 0.0572031 | 0.0270687 | 0.0000091 | 0.0000017 | 1.786 |
| 0.06295354 | 0.0418666 | 0.0188318 | 0.0000053 | 0.0000011 | 3.092 |
| 0.03788595 | 0.0221113 | 0.0085272 | 0.0000009 | 0.0000003 | 4.317 |
| 0.00823408 | -0.0003796 | -0.0029002 | -0.0000038 | -0.0000005 | 5.101 |
| -0.02439747 | -0.0236039 | -0.0143480 | -0.0000082 | -0.0000013 | 4.970 |
| -0.05766771 | -0.0454413 | -0.0246327 | -0.0000118 | -0.0000019 | 4.530 |
| -0.08873362 | -0.0640189 | -0.0327912 | -0.0000147 | -0.0000025 | 3.880 |
| -0.11456132 | -0.0778927 | -0.0382345 | -0.0000164 | -0.0000029 | 2.971 |
| -0.13233269 | -0.0861100 | -0.0407770 | -0.0000170 | -0.0000030 | 2.598 |
| -0.14004979 | -0.0883684 | -0.0407068 | -0.0000170 | -0.0000031 | 2.796 |
| -0.13693797 | -0.0849995 | -0.0386262 | -0.0000162 | -0.0000029 | 3.671 |
| -0.12366972 | -0.0769038 | -0.0352462 | -0.0000152 | -0.0000027 | 5.300 |
| -0.10238834 | -0.0654750 | -0.0312498 | -0.0000141 | -0.0000024 | 7.783 |
| -0.07646653 | -0.0524645 | -0.0272206 | -0.0000133 | -0.0000021 | 10.349 |
| -0.04987478 | -0.0396368 | -0.0234992 | -0.0000123 | -0.0000018 | 12.473 |
| -0.02648029 | -0.0284835 | -0.0201927 | -0.0000114 | -0.0000015 | 14.039 |
| -0.00941035 | -0.0200564 | -0.0173031 | -0.0000105 | -0.0000013 | 14.174 |
| -0.00040012 | -0.0147480 | -0.0147158 | -0.0000091 | -0.0000011 | 12.967 |
| 0.00047588 | -0.0123210 | -0.0122991 | -0.0000077 | -0.0000010 | 10.471 |
| -0.00525723 | -0.0120551 | -0.0099718 | -0.0000060 | -0.0000008 | 7.368 |
| -0.01490347 | -0.0130081 | -0.0077687 | -0.0000044 | -0.0000007 | 3.819 |
| -0.02512937 | -0.0141525 | -0.0057342 | -0.0000026 | -0.0000005 | 0.199 |
| -0.03272246 | -0.0145946 | -0.0039214 | -0.0000012 | -0.0000004 | -1.454 |
| -0.03558352 | -0.0140180 | -0.0026451 | -0.0000010 | -0.0000003 | -1.980 |
| -0.03292494 | -0.0124602 | -0.0021309 | -0.0000005 | -0.0000003 | -2.201 |
| -0.02511795 | -0.0099748 | -0.0021842 | -0.0000003 | -0.0000002 | -2.172 |
| -0.01348716 | -0.0065346 | -0.0022491 | 0.0000000 | -0.0000001 | -2.170 |
| 0.00007395 | -0.0020339 | -0.0016420 | 0.0000006 | 0.0000001 | -1.925 |
| 0.01350191 | 0.0035388 | 0.0000949 | 0.0000013 | 0.0000002 | -1.606 |
| 0.02502071 | 0.0099690 | 0.0030095 | 0.0000024 | 0.0000005 | -1.195 |
| 0.03344851 | 0.0167026 | 0.0066971 | 0.0000035 | 0.0000007 | -0.656 |
| 0.03829913 | 0.0228426 | 0.0104140 | 0.0000045 | 0.0000008 | -0.203 |
| 0.03974990 | 0.0273642 | 0.0133561 | 0.0000052 | 0.0000009 | -0.265 |
| 0.03850953 | 0.0294861 | 0.0149796 | 0.0000059 | 0.0000010 | -0.940 |
| 0.03557628 | 0.0289893 | 0.0151719 | 0.0000062 | 0.0000010 | -2.435 |
| 0.03205253 | 0.0264258 | 0.0143062 | 0.0000067 | 0.0000010 | -4.678 |
| 0.02899899 | 0.0230505 | 0.0131124 | 0.0000072 | 0.0000011 | -7.088 |
| 0.02731386 | 0.0204497 | 0.0124008 | 0.0000078 | 0.0000011 | -9.579 |
| 0.02780332 | 0.0201629 | 0.0129059 | 0.0000091 | 0.0000013 | -12.155 |
| 0.03128511 | 0.0233533 | 0.0151888 | 0.0000110 | 0.0000015 | -14.507 |
| 0.03850775 | 0.0305002 | 0.0194705 | 0.0000133 | 0.0000019 | -15.973 |
| 0.04987307 | 0.0411954 | 0.0254463 | 0.0000157 | 0.0000023 | -16.414 |
| 0.06518769 | 0.0542295 | 0.0323122 | 0.0000181 | 0.0000027 | -15.794 |
| 0.08342403 | 0.0678124 | 0.0389087 | 0.0000199 | 0.0000031 | -13.567 |
| 0.10251288 | 0.0797740 | 0.0438809 | 0.0000205 | 0.0000033 | -10.495 |
| 0.11962656 | 0.0880612 | 0.0461501 | 0.0000203 | 0.0000034 | -7.777 |
| 0.13182250 | 0.0913261 | 0.0454047 | 0.0000194 | 0.0000033 | -6.322 |
| 0.13670881 | 0.0892651 | 0.0422136 | 0.0000182 | 0.0000032 | -5.816 |
| 0.13282498 | 0.0824698 | 0.0375987 | 0.0000165 | 0.0000029 | -5.693 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 0.11985689 | 0.0720379 | 0.0324759 | 0.0000144 | 0.0000025 | -5.712 |
| 0.09878222 | 0.0592198 | 0.0273542 | 0.0000122 | 0.0000021 | -5.977 |
| 0.07185712 | 0.0451916 | 0.0223525 | 0.0000101 | 0.0000017 | -6.374 |
| 0.04227788 | 0.0308993 | 0.0173466 | 0.0000080 | 0.0000012 | -6.669 |
| 0.01356615 | 0.0170054 | 0.0121361 | 0.0000057 | 0.0000008 | -6.529 |
| -0.01122837 | 0.0038695 | 0.0065113 | 0.0000030 | 0.0000003 | -4.768 |
| -0.03038722 | -0.0085647 | 0.0001467 | -0.0000007 | -0.0000003 | -1.621 |
| -0.04372441 | -0.0204959 | -0.0071393 | -0.0000044 | -0.0000008 | 0.930 |
| -0.05209247 | -0.0317180 | -0.0148955 | -0.0000075 | -0.0000013 | 3.310 |
| -0.05707987 | -0.0416952 | -0.0222360 | -0.0000107 | -0.0000017 | 5.342 |
| -0.06048705 | -0.0497282 | -0.0281508 | -0.0000129 | -0.0000021 | 6.526 |
| -0.06367663 | -0.0550918 | -0.0317576 | -0.0000141 | -0.0000022 | 7.058 |
| -0.06719519 | -0.0572972 | -0.0326098 | -0.0000144 | -0.0000023 | 7.026 |
| -0.07062257 | -0.0562402 | -0.0308101 | -0.0000135 | -0.0000022 | 6.107 |
| -0.07264212 | -0.0521378 | -0.0268668 | -0.0000116 | -0.0000019 | 4.761 |
| -0.07149657 | -0.0454728 | -0.0215502 | -0.0000092 | -0.0000016 | 2.937 |
| -0.06547231 | -0.0367590 | -0.0155938 | -0.0000062 | -0.0000012 | 0.443 |
| -0.05327431 | -0.0262289 | -0.0093667 | -0.0000026 | -0.0000006 | -3.043 |
| -0.03431107 | -0.0136876 | -0.0027552 | 0.0000014 | -0.0000000 | -6.036 |
| -0.00922638 | 0.0010017 | 0.0043594 | 0.0000047 | 0.0000006 | -6.692 |
| 0.01978371 | 0.0172836 | 0.0116016 | 0.0000072 | 0.0000011 | -5.878 |
| 0.04950559 | 0.0339268 | 0.0183254 | 0.0000094 | 0.0000016 | -4.248 |
| 0.07638950 | 0.0492093 | 0.0238965 | 0.0000108 | 0.0000019 | -1.945 |
| 0.09704898 | 0.0611121 | 0.0277453 | 0.0000112 | 0.0000021 | 0.740 |
| 0.10868387 | 0.0676732 | 0.0293706 | 0.0000107 | 0.0000021 | 3.211 |
| 0.10947415 | 0.0674737 | 0.0284133 | 0.0000094 | 0.0000019 | 4.913 |
| 0.09882756 | 0.0600070 | 0.0247273 | 0.0000073 | 0.0000016 | 6.084 |
| 0.07729977 | 0.0456498 | 0.0182959 | 0.0000040 | 0.0000010 | 7.474 |
| 0.04635410 | 0.0253871 | 0.0091663 | -0.0000004 | 0.0000002 | 8.382 |
| 0.00838280 | 0.0007813 | -0.0022453 | -0.0000050 | -0.0000006 | 8.337 |
| -0.03336408 | -0.0260819 | -0.0149560 | -0.0000098 | -0.0000015 | 7.617 |
| -0.07511987 | -0.0528085 | -0.0275809 | -0.0000142 | -0.0000024 | 6.374 |
| -0.11298308 | -0.0768833 | -0.0386203 | -0.0000176 | -0.0000030 | 4.644 |
| -0.14324693 | -0.0958200 | -0.0467214 | -0.0000197 | -0.0000035 | 2.399 |
| -0.16272345 | -0.1073955 | -0.0508949 | -0.0000202 | -0.0000037 | 0.536 |
| -0.16924449 | -0.1101546 | -0.0508149 | -0.0000196 | -0.0000036 | -0.086 |
| -0.16206043 | -0.1038437 | -0.0469028 | -0.0000179 | -0.0000033 | 0.054 |
| -0.14183718 | -0.0893811 | -0.0399826 | -0.0000151 | -0.0000028 | 0.716 |
| -0.11054424 | -0.0686095 | -0.0309488 | -0.0000116 | -0.0000021 | 1.451 |
| -0.07120624 | -0.0438530 | -0.0205465 | -0.0000074 | -0.0000013 | 1.825 |
| -0.02752134 | -0.0174103 | -0.0093085 | -0.0000027 | -0.0000004 | 1.501 |
| 0.01657562 | 0.0087956 | 0.0023425 | 0.0000023 | 0.0000005 | 1.029 |
| 0.05724200 | 0.0331967 | 0.0138262 | 0.0000068 | 0.0000013 | 0.575 |
| 0.09115219 | 0.0544775 | 0.0243482 | 0.0000108 | 0.0000020 | -0.108 |
| 0.11597430 | 0.0715458 | 0.0331069 | 0.0000142 | 0.0000026 | -1.314 |
| 0.13066900 | 0.0835600 | 0.0395313 | 0.0000169 | 0.0000030 | -2.791 |
| 0.13543382 | 0.0899481 | 0.0433328 | 0.0000184 | 0.0000032 | -4.427 |
| 0.13148003 | 0.0905586 | 0.0445056 | 0.0000191 | 0.0000033 | -6.489 |
| 0.12081328 | 0.0859387 | 0.0433822 | 0.0000192 | 0.0000032 | -9.321 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 0.10598641 | 0.0774893 | 0.0406420 | 0.0000191 | 0.0000031 | -12.358 |
| 0.08970597 | 0.0672300 | 0.0371197 | 0.0000186 | 0.0000029 | -15.403 |
| 0.07457874 | 0.0574421 | 0.0336960 | 0.0000184 | 0.0000027 | -18.417 |
| 0.06288645 | 0.0501914 | 0.0311704 | 0.0000182 | 0.0000026 | -19.726 |
| 0.05606880 | 0.0465856 | 0.0298517 | 0.0000175 | 0.0000025 | -19.227 |
| 0.05463574 | 0.0466344 | 0.0296162 | 0.0000172 | 0.0000025 | -18.796 |
| 0.05856228 | 0.0498054 | 0.0304097 | 0.0000177 | 0.0000026 | -18.412 |
| 0.06732470 | 0.0553459 | 0.0322670 | 0.0000184 | 0.0000027 | -18.045 |
| 0.07987966 | 0.0624967 | 0.0351499 | 0.0000197 | 0.0000030 | -17.683 |
| 0.09475675 | 0.0706179 | 0.0388380 | 0.0000211 | 0.0000033 | -17.326 |
| 0.11025607 | 0.0791758 | 0.0429284 | 0.0000226 | 0.0000036 | -16.958 |
| 0.12468843 | 0.0876217 | 0.0469234 | 0.0000239 | 0.0000038 | -16.467 |
| 0.13652025 | 0.0951981 | 0.0502797 | 0.0000248 | 0.0000040 | -14.987 |
| 0.14427583 | 0.1006860 | 0.0522960 | 0.0000244 | 0.0000040 | -12.296 |
| 0.14654468 | 0.1025059 | 0.0521868 | 0.0000230 | 0.0000039 | -9.461 |
| 0.14224822 | 0.0992648 | 0.0494312 | 0.0000209 | 0.0000036 | -6.858 |
| 0.13079867 | 0.0902290 | 0.0439447 | 0.0000179 | 0.0000031 | -5.097 |
| 0.11226674 | 0.0756609 | 0.0361405 | 0.0000145 | 0.0000025 | -4.210 |
| 0.08744834 | 0.0568076 | 0.0267955 | 0.0000107 | 0.0000019 | -3.920 |
| 0.05781810 | 0.0355505 | 0.0167963 | 0.0000068 | 0.0000011 | -3.548 |
| 0.02533768 | 0.0138302 | 0.0068512 | 0.0000026 | 0.0000004 | -2.553 |
| -0.00777701 | -0.0068476 | -0.0026429 | -0.0000017 | -0.0000003 | -1.096 |
| -0.03922321 | -0.0255585 | -0.0114831 | -0.0000057 | -0.0000010 | 0.543 |
| -0.06684874 | -0.0418674 | -0.0195158 | -0.0000094 | -0.0000017 | 2.491 |
| -0.08903747 | -0.0556965 | -0.0266499 | -0.0000128 | -0.0000022 | 4.941 |
| -0.10505585 | -0.0671802 | -0.0329184 | -0.0000160 | -0.0000027 | 7.781 |
| -0.11515254 | -0.0765028 | -0.0384360 | -0.0000189 | -0.0000031 | 10.662 |
| -0.12037633 | -0.0837757 | -0.0432621 | -0.0000214 | -0.0000035 | 13.186 |
| -0.12222790 | -0.0890298 | -0.0472981 | -0.0000234 | -0.0000037 | 15.439 |
| -0.12238614 | -0.0924152 | -0.0504049 | -0.0000251 | -0.0000039 | 18.181 |
| -0.12258504 | -0.0945041 | -0.0526860 | -0.0000270 | -0.0000042 | 21.273 |
| -0.12436089 | -0.0962767 | -0.0545214 | -0.0000287 | -0.0000044 | 24.281 |
| -0.12872292 | -0.0987909 | -0.0563582 | -0.0000303 | -0.0000046 | 25.725 |
| -0.13575181 | -0.1025883 | -0.0583115 | -0.0000309 | -0.0000047 | 25.576 |
| -0.14464624 | -0.1074819 | -0.0601627 | -0.0000313 | -0.0000049 | 24.472 |
| -0.15404937 | -0.1126884 | -0.0615933 | -0.0000313 | -0.0000049 | 22.670 |
| -0.16228990 | -0.1170132 | -0.0622752 | -0.0000307 | -0.0000049 | 20.075 |
| -0.16746870 | -0.1190010 | -0.0617725 | -0.0000293 | -0.0000048 | 16.268 |
| -0.16760605 | -0.1171809 | -0.0595191 | -0.0000269 | -0.0000045 | 13.448 |
| -0.16135468 | -0.1108160 | -0.0553522 | -0.0000249 | -0.0000042 | 12.131 |
| -0.14837156 | -0.1001873 | -0.0496516 | -0.0000225 | -0.0000037 | 11.763 |
| -0.12927600 | -0.0863474 | -0.0430533 | -0.0000199 | -0.0000033 | 11.764 |
| -0.10546651 | -0.0706863 | -0.0361257 | -0.0000170 | -0.0000027 | 11.437 |
| -0.07886739 | -0.0545022 | -0.0291807 | -0.0000140 | -0.0000022 | 11.043 |
| -0.05175747 | -0.0388388 | -0.0223811 | -0.0000111 | -0.0000017 | 10.309 |
| -0.02641578 | -0.0243714 | -0.0158026 | -0.0000081 | -0.0000011 | 9.117 |
| -0.00473903 | -0.0114359 | -0.0094946 | -0.0000052 | -0.0000006 | 7.656 |
| 0.01202531 | -0.0002048 | -0.0035641 | -0.0000024 | -0.0000002 | 5.991 |
| 0.02342648 | 0.0091565 | 0.0017994 | -0.0000000 | 0.0000002 | 4.383 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 0.02976856 | 0.0164017 | 0.0063279 | 0.0000020 | 0.0000005 | 2.712 |
| 0.03200554 | 0.0213278 | 0.0097998 | 0.0000037 | 0.0000007 | 0.592 |
| 0.03156933 | 0.0240100 | 0.0121916 | 0.0000052 | 0.0000009 | -1.654 |
| 0.02999539 | 0.0248506 | 0.0136283 | 0.0000063 | 0.0000010 | -3.632 |
| 0.02854916 | 0.0244859 | 0.0142771 | 0.0000070 | 0.0000011 | -5.086 |
| 0.02799240 | 0.0236132 | 0.0142888 | 0.0000072 | 0.0000011 | -5.728 |
| 0.02843498 | 0.0227059 | 0.0137228 | 0.0000068 | 0.0000010 | -4.762 |
| 0.02925528 | 0.0217087 | 0.0124527 | 0.0000056 | 0.0000009 | -3.140 |
| 0.02947346 | 0.0202150 | 0.0104273 | 0.0000044 | 0.0000007 | -1.542 |
| 0.02806601 | 0.0176886 | 0.0077666 | 0.0000028 | 0.0000005 | 0.917 |
| 0.02394223 | 0.0134381 | 0.0044739 | 0.0000004 | 0.0000002 | 3.453 |
| 0.01627173 | 0.0069711 | 0.0005286 | -0.0000017 | -0.0000001 | 4.788 |
| 0.00492298 | -0.0015814 | -0.0038602 | -0.0000035 | -0.0000004 | 5.252 |
| -0.00952024 | -0.0115309 | -0.0083572 | -0.0000053 | -0.0000008 | 5.156 |
| -0.02587586 | -0.0218731 | -0.0126342 | -0.0000068 | -0.0000011 | 4.615 |
| -0.04251365 | -0.0315291 | -0.0164096 | -0.0000081 | -0.0000013 | 4.049 |
| -0.05762756 | -0.0396035 | -0.0194934 | -0.0000091 | -0.0000016 | 3.545 |
| -0.06949128 | -0.0454814 | -0.0217487 | -0.0000098 | -0.0000017 | 2.983 |
| -0.07664885 | -0.0487527 | -0.0229983 | -0.0000099 | -0.0000018 | 2.014 |
| -0.07801288 | -0.0490287 | -0.0229353 | -0.0000092 | -0.0000017 | 0.451 |
| -0.07298133 | -0.0458786 | -0.0211906 | -0.0000077 | -0.0000014 | -0.777 |
| -0.06170577 | -0.0390962 | -0.0176543 | -0.0000059 | -0.0000011 | -1.349 |
| -0.04516096 | -0.0289376 | -0.0126226 | -0.0000039 | -0.0000008 | -0.946 |
| -0.02503661 | -0.0162613 | -0.0067454 | -0.0000019 | -0.0000004 | -0.240 |
| -0.00332530 | -0.0023172 | -0.0006745 | 0.0000004 | 0.0000001 | -0.220 |
| 0.01812179 | 0.0116237 | 0.0052446 | 0.0000030 | 0.0000005 | -0.437 |
| 0.03767609 | 0.0243965 | 0.0108350 | 0.0000052 | 0.0000009 | -0.895 |
| 0.05402145 | 0.0351116 | 0.0159410 | 0.0000074 | 0.0000013 | -1.705 |
| 0.06628524 | 0.0433065 | 0.0203824 | 0.0000093 | 0.0000016 | -2.938 |
| 0.07415476 | 0.0489833 | 0.0239978 | 0.0000111 | 0.0000019 | -4.742 |
| 0.07798681 | 0.0525771 | 0.0267787 | 0.0000129 | 0.0000021 | -7.404 |
| 0.07882782 | 0.0548603 | 0.0289711 | 0.0000146 | 0.0000023 | -10.138 |
| 0.07810004 | 0.0566157 | 0.0308845 | 0.0000160 | 0.0000025 | -12.403 |
| 0.07723425 | 0.0583884 | 0.0327006 | 0.0000172 | 0.0000026 | -13.958 |
| 0.07737382 | 0.0604088 | 0.0344083 | 0.0000180 | 0.0000028 | -14.754 |
| 0.07916452 | 0.0626283 | 0.0358439 | 0.0000185 | 0.0000028 | -14.839 |
| 0.08268954 | 0.0648472 | 0.0368238 | 0.0000189 | 0.0000029 | -15.018 |
| 0.08770370 | 0.0670248 | 0.0374340 | 0.0000195 | 0.0000030 | -16.124 |
| 0.09392721 | 0.0695046 | 0.0381670 | 0.0000206 | 0.0000032 | -17.553 |
| 0.10099892 | 0.0727629 | 0.0395615 | 0.0000216 | 0.0000033 | -18.064 |
| 0.10831573 | 0.0769662 | 0.0417350 | 0.0000223 | 0.0000035 | -18.121 |
| 0.11522969 | 0.0819087 | 0.0444192 | 0.0000233 | 0.0000037 | -17.739 |
| 0.12120839 | 0.0870443 | 0.0471335 | 0.0000240 | 0.0000038 | -17.588 |
| 0.12601719 | 0.0917304 | 0.0494892 | 0.0000250 | 0.0000039 | -17.940 |
| 0.12972088 | 0.0954546 | 0.0513299 | 0.0000258 | 0.0000041 | -18.425 |
| 0.13242524 | 0.0978572 | 0.0525786 | 0.0000262 | 0.0000041 | -18.089 |
| 0.13383832 | 0.0984994 | 0.0529024 | 0.0000256 | 0.0000041 | -15.727 |
| 0.13292722 | 0.0965797 | 0.0515181 | 0.0000234 | 0.0000038 | -12.049 |
| 0.12818799 | 0.0911315 | 0.0476158 | 0.0000204 | -0.0000034 | -8.429 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

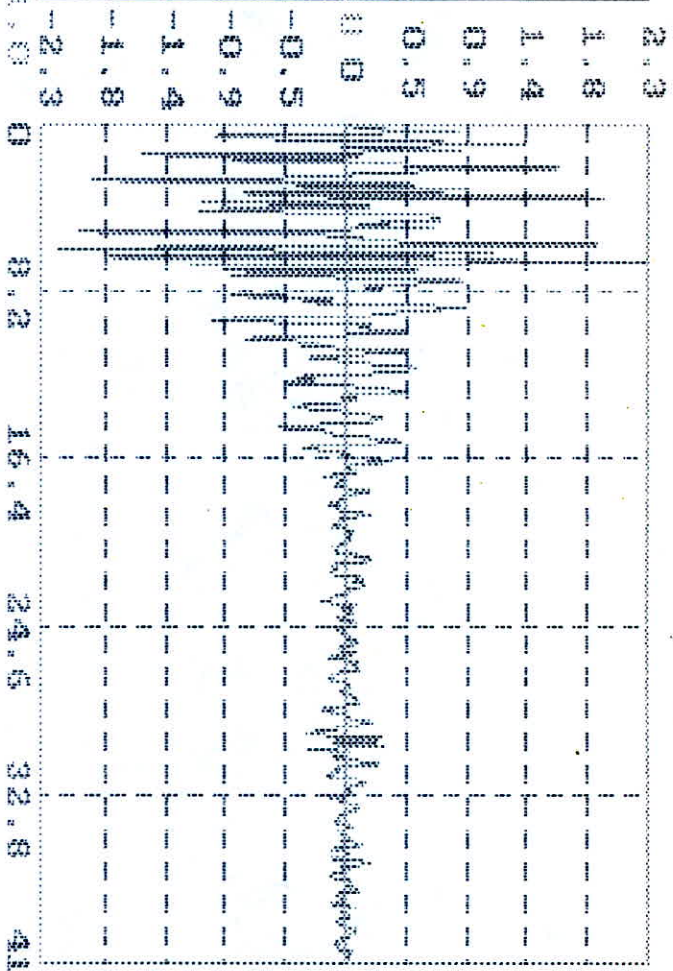
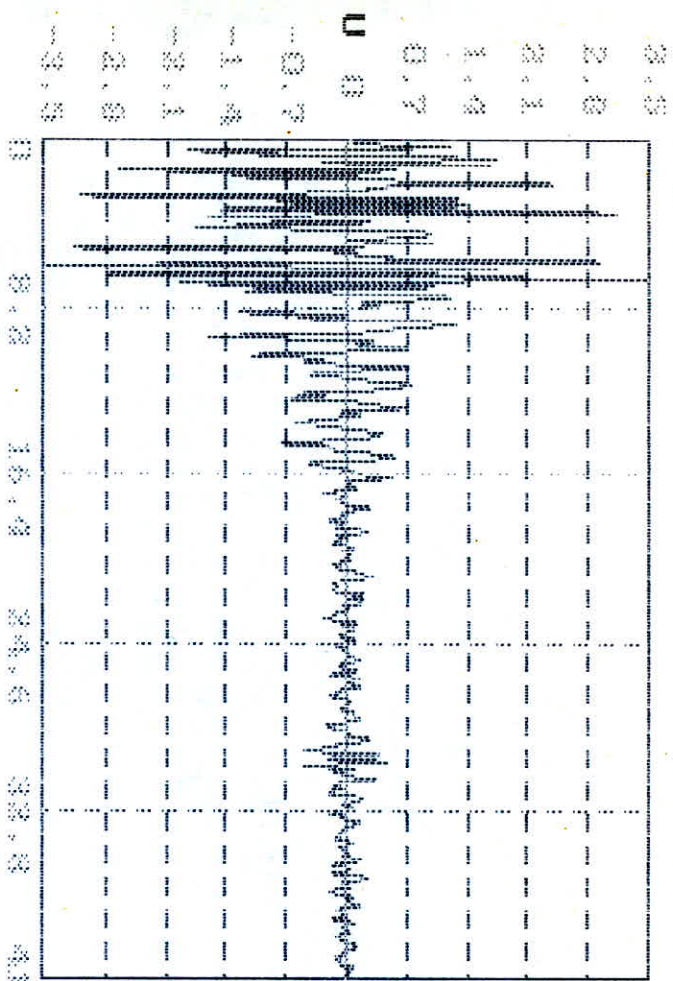
| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 0.11815593 | 0.0814022 | 0.0408889 | 0.0000166 | 0.0000028 | -4.429 |
| 0.10153393 | 0.0668587 | 0.0314717 | 0.0000113 | 0.0000021 | 0.038 |
| 0.07737346 | 0.0472691 | 0.0197655 | 0.0000053 | 0.0000011 | 3.973 |
| 0.04551597 | 0.0230385 | 0.0064593 | -0.0000008 | 0.0000001 | 6.842 |
| 0.00687936 | -0.0046495 | -0.0075612 | -0.0000070 | -0.0000009 | 8.925 |
| -0.03656538 | -0.0340341 | -0.0214509 | -0.0000129 | -0.0000020 | 10.230 |
| -0.08197719 | -0.0631081 | -0.0345476 | -0.0000183 | -0.0000029 | 11.725 |
| -0.12611668 | -0.0901092 | -0.0465181 | -0.0000237 | -0.0000039 | 13.144 |
| -0.16566999 | -0.1136547 | -0.0571488 | -0.0000280 | -0.0000047 | 14.091 |
| -0.19758818 | -0.1326890 | -0.0661134 | -0.0000316 | -0.0000053 | 15.038 |
| -0.21966300 | -0.1465703 | -0.0730842 | -0.0000345 | -0.0000058 | 16.921 |
| -0.23109770 | -0.1552267 | -0.0780075 | -0.0000371 | -0.0000062 | 19.692 |
| -0.23257773 | -0.1590415 | -0.0810704 | -0.0000388 | -0.0000064 | 22.164 |
| -0.22583619 | -0.1585236 | -0.0823937 | -0.0000395 | -0.0000064 | 24.337 |
| -0.21327832 | -0.1542862 | -0.0820189 | -0.0000397 | -0.0000063 | 26.230 |
| -0.19759234 | -0.1471328 | -0.0800300 | -0.0000391 | -0.0000062 | 27.953 |
| -0.18136925 | -0.1381220 | -0.0766911 | -0.0000382 | -0.0000059 | 29.422 |
| -0.16659776 | -0.1283505 | -0.0723442 | -0.0000365 | -0.0000056 | 28.015 |
| -0.15385431 | -0.1182258 | -0.0668765 | -0.0000328 | -0.0000051 | 24.589 |
| -0.14253052 | -0.1076030 | -0.0600736 | -0.0000292 | -0.0000045 | 21.841 |
| -0.13164901 | -0.0964136 | -0.0522897 | -0.0000257 | -0.0000040 | 18.571 |
| -0.11991992 | -0.0845028 | -0.0440792 | -0.0000212 | -0.0000034 | 14.531 |
| -0.10598026 | -0.0716384 | -0.0358805 | -0.0000170 | -0.0000028 | 11.680 |
| -0.08914144 | -0.0580222 | -0.0282272 | -0.0000138 | -0.0000022 | 10.113 |
| -0.06964255 | -0.0443150 | -0.0216069 | -0.0000109 | -0.0000017 | 8.799 |
| -0.04850563 | -0.0313168 | -0.0161866 | -0.0000084 | -0.0000013 | 8.794 |
| -0.02761919 | -0.0200005 | -0.0120590 | -0.0000073 | -0.0000010 | 9.566 |
| -0.00933497 | -0.0112427 | -0.0092314 | -0.0000062 | -0.0000008 | 9.683 |
| 0.00431936 | -0.0053577 | -0.0073909 | -0.0000051 | -0.0000006 | 8.592 |
| 0.01225005 | -0.0019353 | -0.0059075 | -0.0000037 | -0.0000004 | 6.114 |
| 0.01465236 | 0.0000596 | -0.0040114 | -0.0000018 | -0.0000001 | 2.418 |
| 0.01307856 | 0.0020294 | -0.0010183 | 0.0000008 | 0.0000001 | -2.214 |
| 0.01021098 | 0.0054336 | 0.0035010 | 0.0000041 | 0.0000005 | -7.141 |
| 0.00933671 | 0.0114742 | 0.0096221 | 0.0000078 | 0.0000010 | -12.078 |
| 0.01369669 | 0.0209152 | 0.0171252 | 0.0000121 | 0.0000016 | -16.197 |
| 0.02574239 | 0.0339552 | 0.0255697 | 0.0000164 | 0.0000022 | -19.842 |
| 0.04670047 | 0.0503859 | 0.0345640 | 0.0000211 | 0.0000030 | -22.643 |
| 0.07619870 | 0.0696164 | 0.0437961 | 0.0000253 | 0.0000037 | -23.824 |
| 0.11212321 | 0.0906162 | 0.0529160 | 0.0000290 | 0.0000044 | -24.325 |
| 0.15113458 | 0.1121768 | 0.0616993 | 0.0000329 | 0.0000052 | -24.449 |
| 0.18933028 | 0.1330593 | 0.0700522 | 0.0000362 | 0.0000058 | -24.489 |
| 0.22294972 | 0.1520703 | 0.0779134 | 0.0000394 | 0.0000064 | -24.752 |
| 0.24901634 | 0.1681345 | 0.0851460 | 0.0000423 | 0.0000069 | -25.284 |
| 0.26573721 | 0.1803257 | 0.0914313 | 0.0000446 | 0.0000073 | -25.971 |
| 0.27265608 | 0.1879340 | 0.0962752 | 0.0000464 | 0.0000076 | -27.374 |
| 0.27071336 | 0.1907197 | 0.0992717 | 0.0000479 | 0.0000077 | -29.749 |
| 0.26199085 | 0.1890528 | 0.1002883 | 0.0000488 | 0.0000078 | -32.027 |
| 0.24896686 | 0.1836350 | 0.0992799 | 0.0000484 | 0.0000077 | -32.832 |
| 0.23352586 | 0.1749200 | 0.0959104 | 0.0000460 | 0.0000073 | -29.518 |

TABLEAU DES DEPLACEMENTS ET ROTATIONS EN FONCTION DES ACCELERATIONS

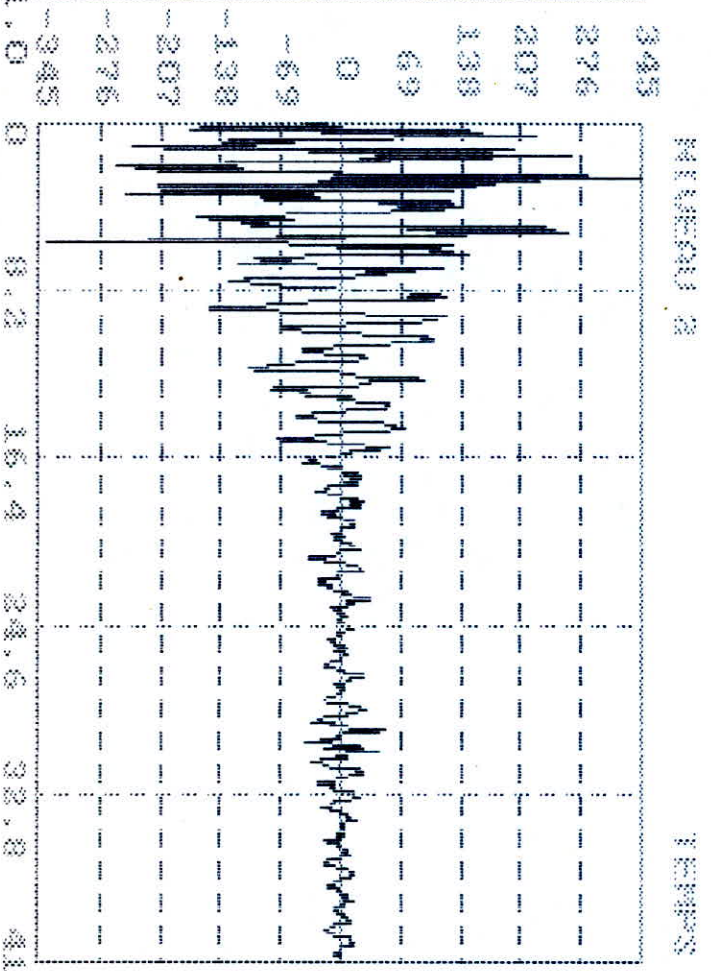
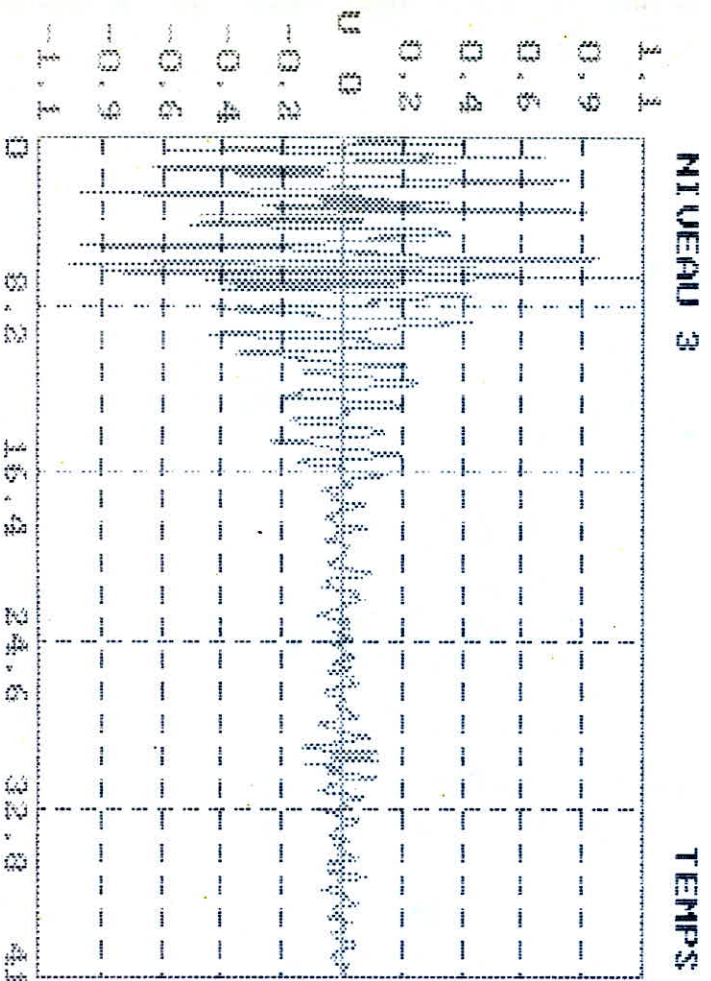
| TRANSLATION DES NIVEAUX | | | TRANSLATION DE LA FONDATION | ROTATION DE LA FONDATION | ACCELERATION SISMIQUE |
|-------------------------|------------|------------|-----------------------------|--------------------------|-----------------------|
| NIVEAU3 | NIVEAU2 | NIVEAU1 | | | |
| 0.21597578 | 0.1624150 | 0.0891998 | 0.0000406 | 0.0000065 | -23.447 |
| 0.19523932 | 0.1450242 | 0.0782095 | 0.0000339 | 0.0000055 | -16.628 |
| 0.16954402 | 0.1217751 | 0.0628312 | 0.0000256 | 0.0000043 | -9.434 |
| 0.13706950 | 0.0923697 | 0.0439782 | 0.0000165 | 0.0000029 | -4.942 |
| 0.09719700 | 0.0581401 | 0.0238403 | 0.0000091 | 0.0000017 | -4.168 |
| 0.05124972 | 0.0222410 | 0.0053398 | 0.0000029 | 0.0000005 | -5.262 |
| 0.00234402 | -0.0112479 | -0.0091021 | -0.0000018 | -0.0000004 | -7.580 |
| -0.04490780 | -0.0383511 | -0.0182590 | -0.0000044 | -0.0000010 | -9.655 |
| -0.08520687 | -0.0563695 | -0.0223697 | -0.0000061 | -0.0000015 | -9.715 |
| -0.11392875 | -0.0649203 | -0.0230963 | -0.0000078 | -0.0000018 | -5.529 |
| -0.12872807 | -0.0664429 | -0.0232149 | -0.0000110 | -0.0000022 | 2.589 |
| -0.13042533 | -0.0654554 | -0.0256617 | -0.0000156 | -0.0000027 | 12.995 |
| -0.12318801 | -0.0671285 | -0.0325857 | -0.0000222 | -0.0000034 | 26.070 |
| -0.11430809 | -0.0761395 | -0.0451250 | -0.0000314 | -0.0000045 | 38.664 |
| -0.11238339 | -0.0950975 | -0.0628280 | -0.0000406 | -0.0000057 | 46.900 |
| -0.12470334 | -0.1234261 | -0.0833410 | -0.0000489 | -0.0000070 | 50.689 |
| -0.15544615 | -0.1579182 | -0.1033894 | -0.0000564 | -0.0000082 | 51.753 |
| -0.20474313 | -0.1942687 | -0.1202174 | -0.0000625 | -0.0000093 | 50.439 |
| -0.26814901 | -0.2282568 | -0.1322284 | -0.0000663 | -0.0000102 | 46.175 |
| -0.33693452 | -0.2563422 | -0.1388886 | -0.0000674 | -0.0000108 | 40.575 |
| -0.39982424 | -0.2761263 | -0.1406352 | -0.0000668 | -0.0000111 | 34.133 |
| -0.44521772 | -0.2861108 | -0.1383478 | -0.0000639 | -0.0000109 | 26.776 |
| -0.46338614 | -0.2850651 | -0.1326558 | -0.0000590 | -0.0000104 | 19.422 |
| -0.44847689 | -0.2717728 | -0.1236829 | -0.0000527 | -0.0000094 | 13.444 |
| -0.39967891 | -0.2452080 | -0.1111051 | -0.0000451 | -0.0000081 | 8.022 |
| -0.32083157 | -0.2046403 | -0.0940231 | -0.0000351 | -0.0000064 | 2.719 |
| -0.21922510 | -0.1501146 | -0.0712655 | -0.0000233 | -0.0000042 | -1.196 |
| -0.10435163 | -0.0834098 | -0.0423565 | -0.0000104 | -0.0000019 | -2.808 |
| 0.01350362 | -0.0086113 | -0.0083029 | 0.0000032 | 0.0000006 | -3.236 |
| 0.12480854 | 0.0682641 | 0.0283997 | 0.0000170 | 0.0000031 | -2.595 |
| 0.22163600 | 0.1400032 | 0.0640346 | 0.0000292 | 0.0000054 | -1.255 |
| 0.29796559 | 0.1992999 | 0.0943301 | 0.0000391 | 0.0000071 | -0.005 |
| 0.34973426 | 0.2401000 | 0.1154822 | 0.0000456 | 0.0000082 | 0.042 |
| 0.37476722 | 0.2587822 | 0.1251437 | 0.0000485 | 0.0000087 | -0.717 |
| 0.37241486 | 0.2545402 | 0.1227486 | 0.0000468 | 0.0000084 | -1.427 |
| 0.34329647 | 0.2291405 | 0.1093530 | 0.0000411 | 0.0000074 | -2.362 |
| 0.28955238 | 0.1865166 | 0.0874143 | 0.0000328 | 0.0000059 | -3.856 |
| 0.21527147 | 0.1321672 | 0.0603791 | 0.0000229 | 0.0000041 | -6.230 |
| 0.12677265 | 0.0724437 | 0.0320919 | 0.0000130 | 0.0000022 | -9.502 |
| 0.03245989 | 0.0138024 | 0.0061126 | 0.0000043 | 0.0000005 | -13.269 |
| -0.05784572 | -0.0378696 | -0.0148566 | -0.0000024 | -0.0000010 | -17.510 |
| -0.13386194 | -0.0776173 | -0.0291143 | -0.0000062 | -0.0000019 | -22.669 |
| -0.18591378 | -0.1014615 | -0.0356759 | -0.0000062 | -0.0000022 | -28.965 |
| -0.20614068 | -0.1064348 | -0.0339580 | -0.0000026 | -0.0000018 | -35.236 |
| -0.18989635 | -0.0909752 | -0.0238586 | 0.0000039 | -0.0000008 | -39.660 |
| -0.13695401 | -0.0555340 | -0.0060851 | 0.0000123 | 0.0000007 | -40.715 |
| -0.05201956 | -0.0030018 | 0.0176617 | 0.0000216 | 0.0000025 | -38.461 |
| 0.05579672 | 0.0614499 | 0.0449582 | 0.0000314 | 0.0000045 | -33.770 |
| 0.17421344 | 0.1309342 | 0.0730566 | 0.0000406 | 0.0000065 | -26.592 |

ANNEXE C

GRAPHES DES DEPLACEMENTS ET
ACCELERATIONS CONCERNANT LA
(STRUCTURE ENCASTREE)



U: DEPLACEMENT



U: ACCELERATION

NI UENAU 1

TEMPS

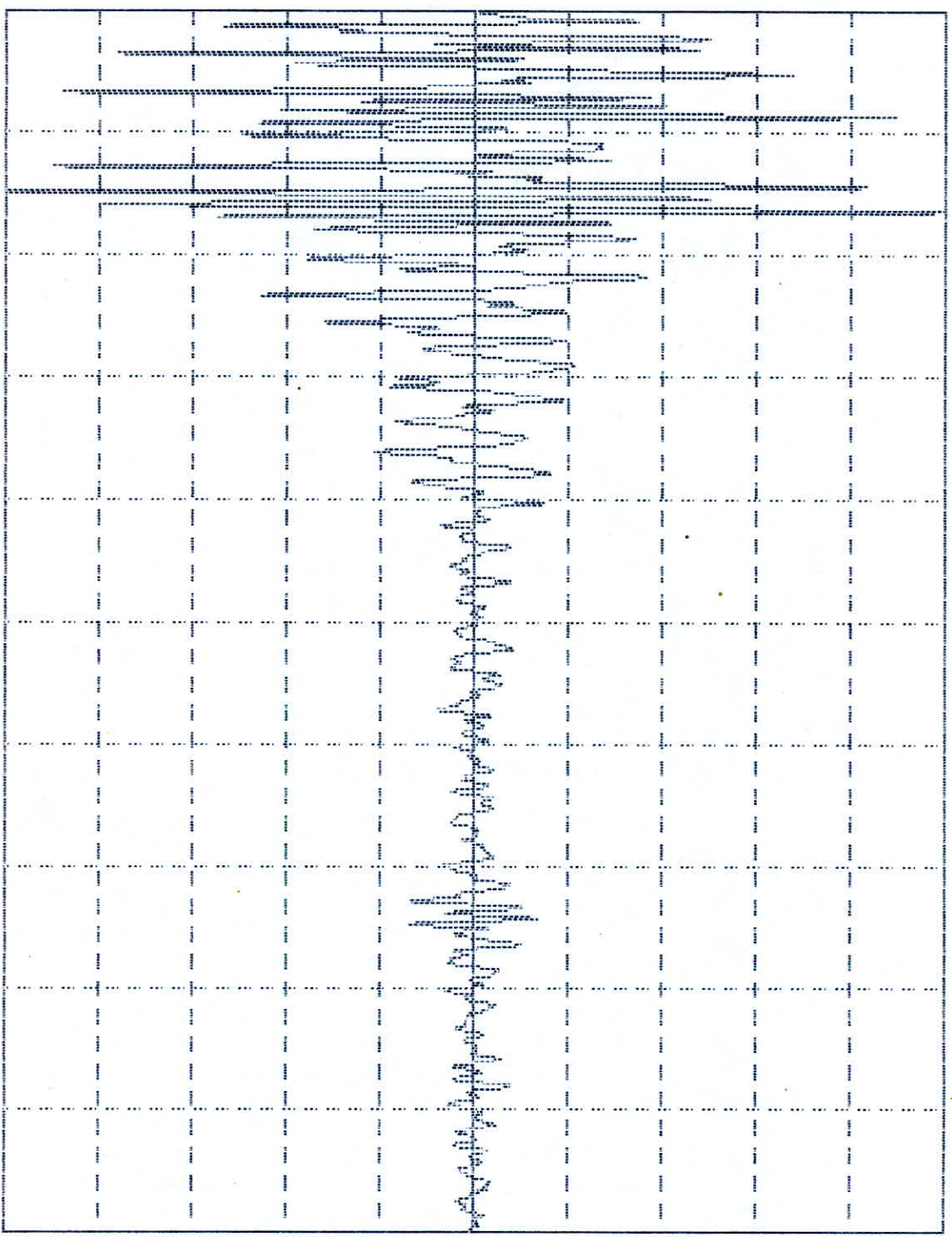
ACCELERATION

TEMPS

ORANGE RES MECHANICAL RES INDEX

DISPLACEMENT

3.5
2.8
2.1
1.4
0.7
0
-0.7
-1.4
-2.1
-2.8
-3.5



● NIUEAU 3

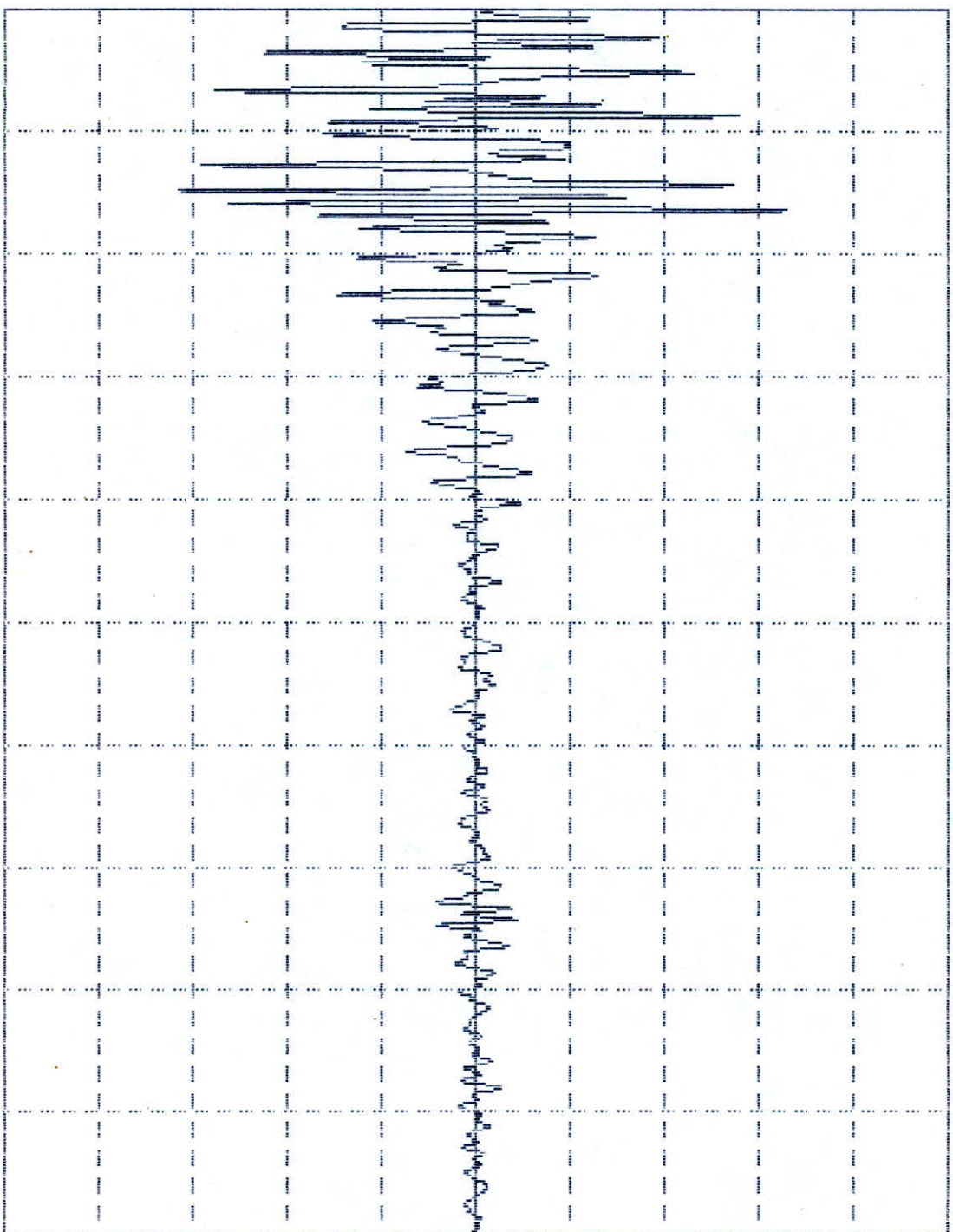
0 4.1 8.2 12.3 16.4 20.5 24.6 28.7 32.8 36.9 41.0

TEMPS

ORANGES RES MEPTAQUEMENDOS RES INUREAUX

DEPLACEMENT

3.5
2.8
2.1
1.4
0.7
0
-0.7
-1.4
-2.1
-2.8
-3.5



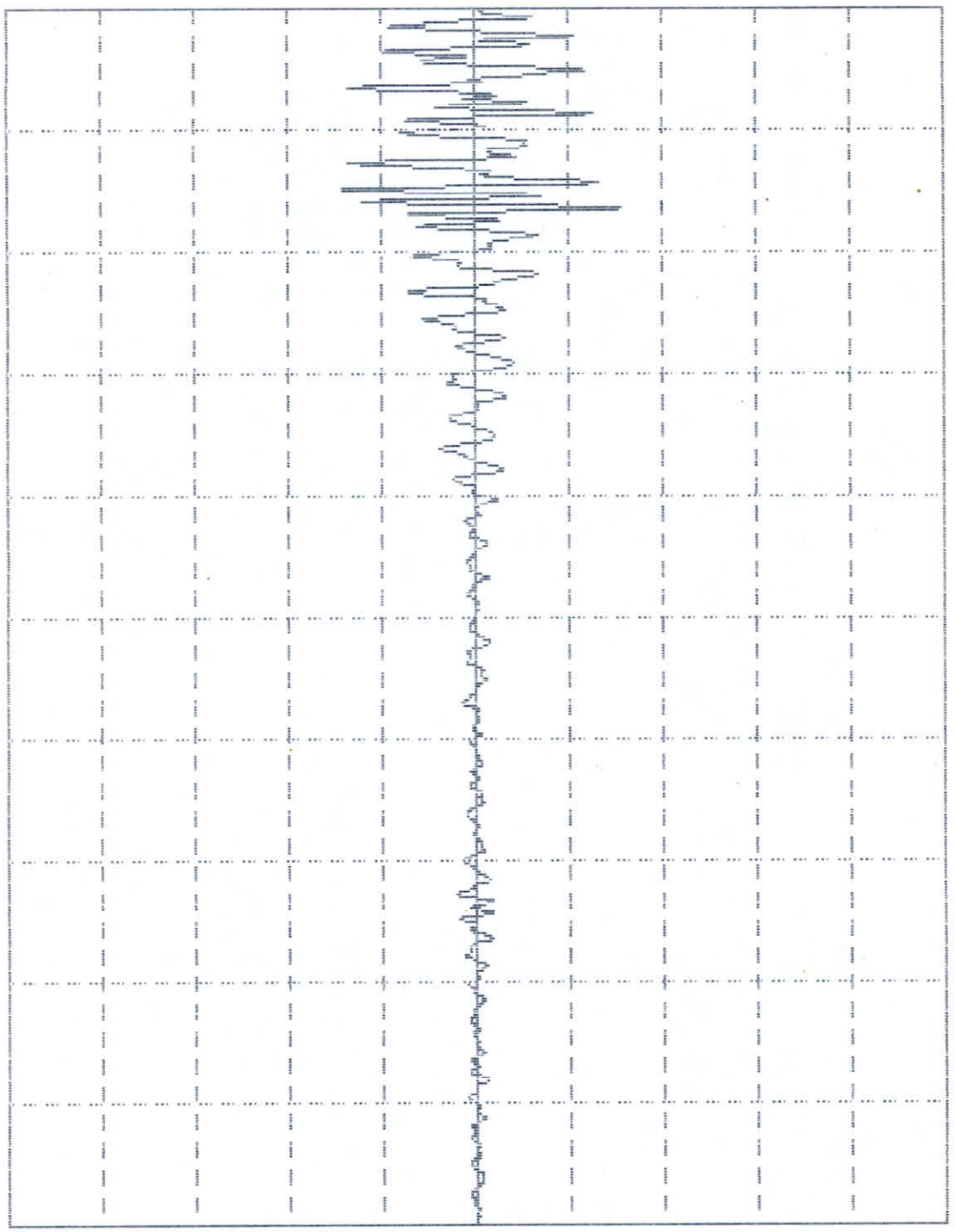
● NIVEAU 2

0 4.1 8.2 12.3 16.4 20.5 24.6 28.7 32.8 36.9 41.0

TEMPS

DEPLACEMENTS TIME TEMPERATURES PRESSURE INDEX

DEPLACEMENT
3.5
2.8
2.1
1.4
0.7
0
-0.7
-1.4
-2.1
-2.8
-3.5



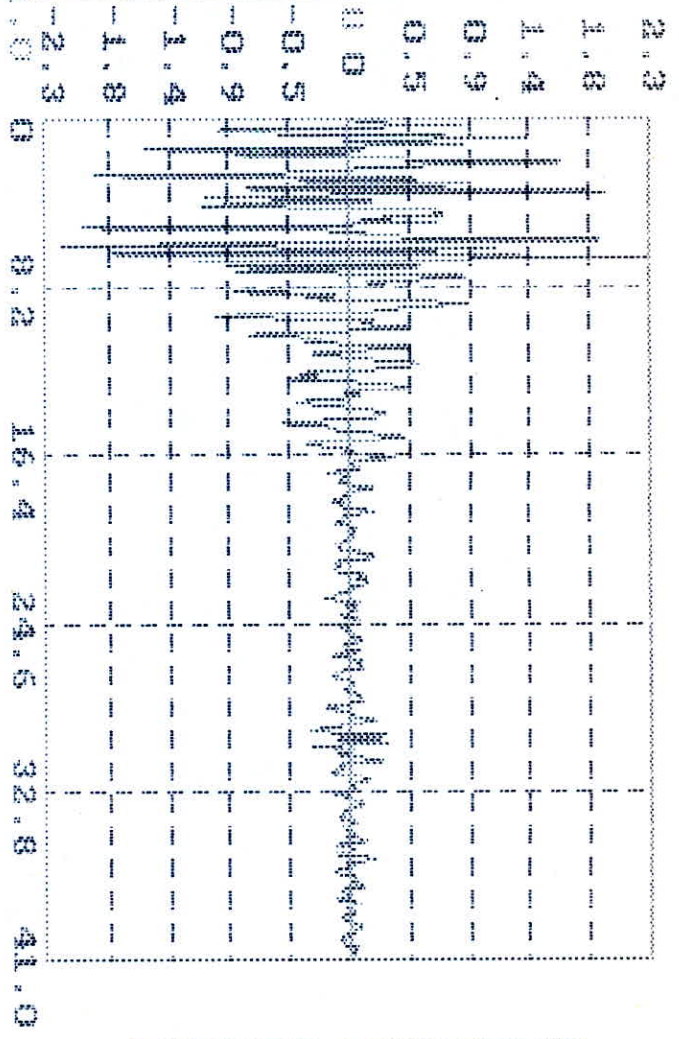
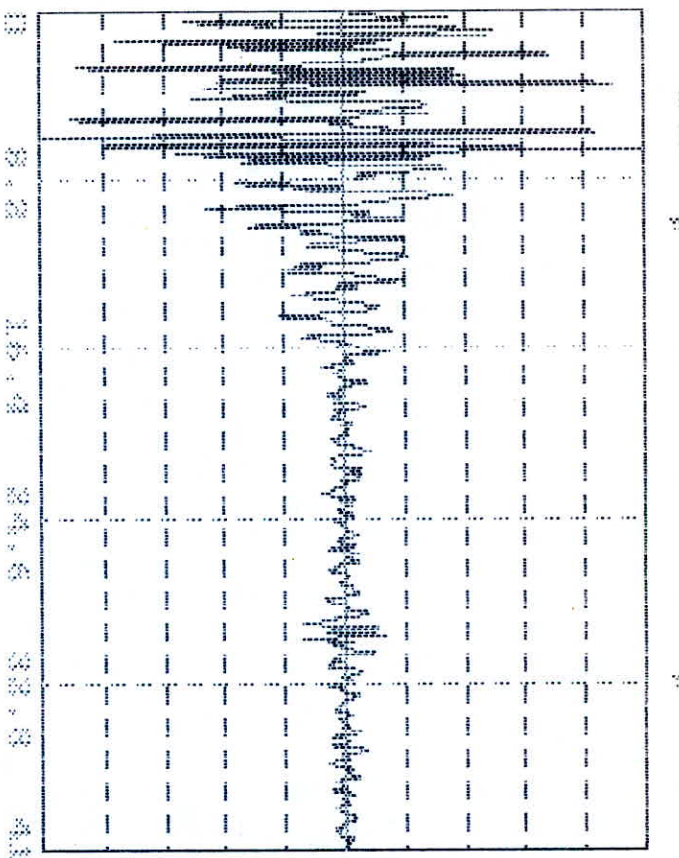
NIUEAU 1

TEMPS

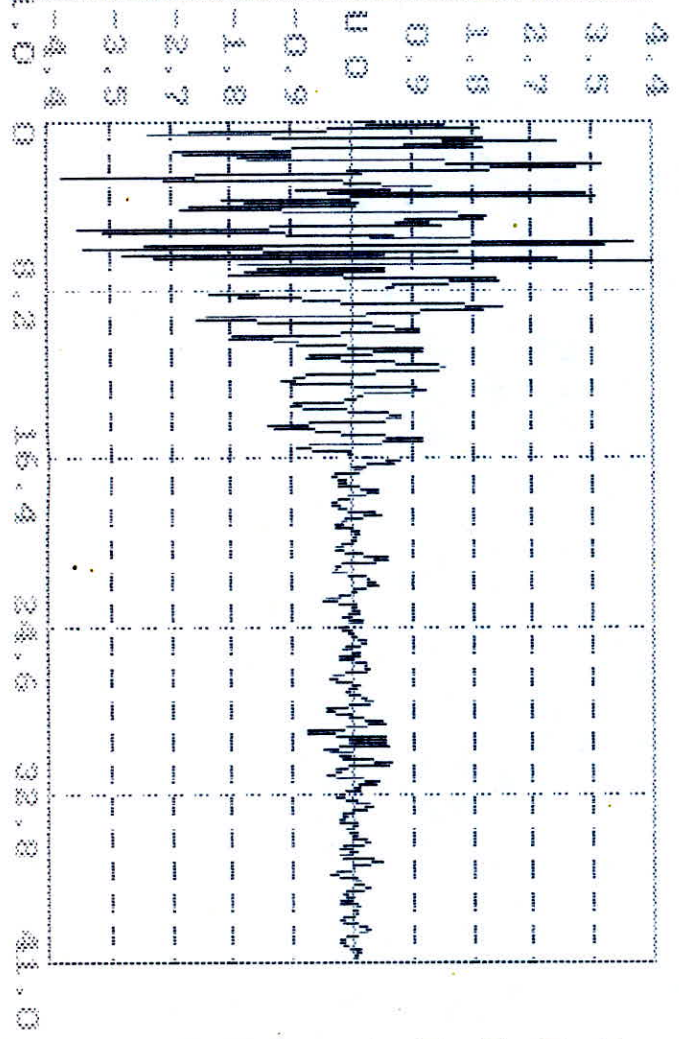
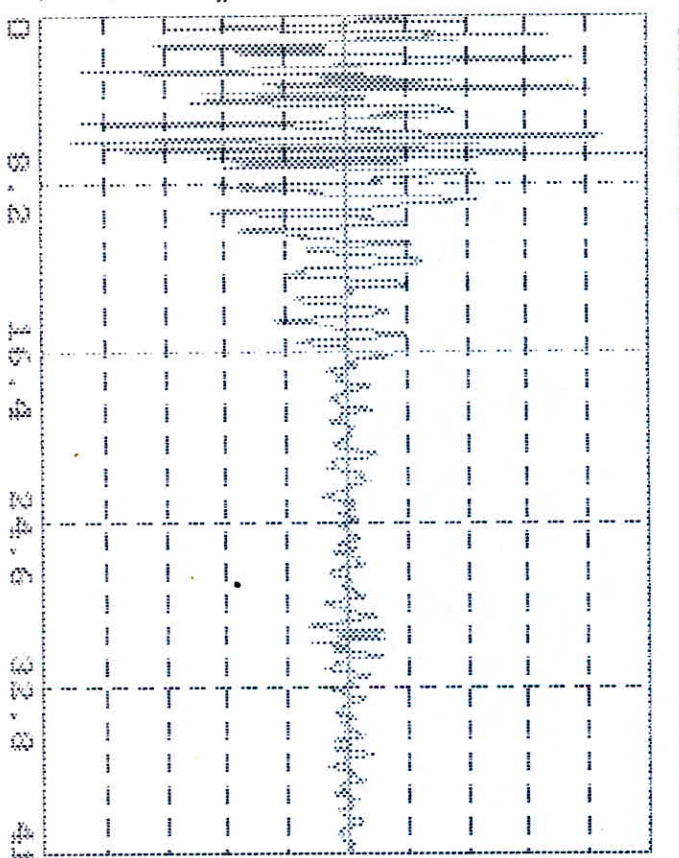
ANNEXE D

GRAPHES DES DEPLACEMENTS ET
ACCELERATIONS CONCERNANT LA
(STRUCTURE AVEC FONDATION)

DETAILED DESIGN REPORTS FOR NUCEAUX



U:DEPLACEMENT

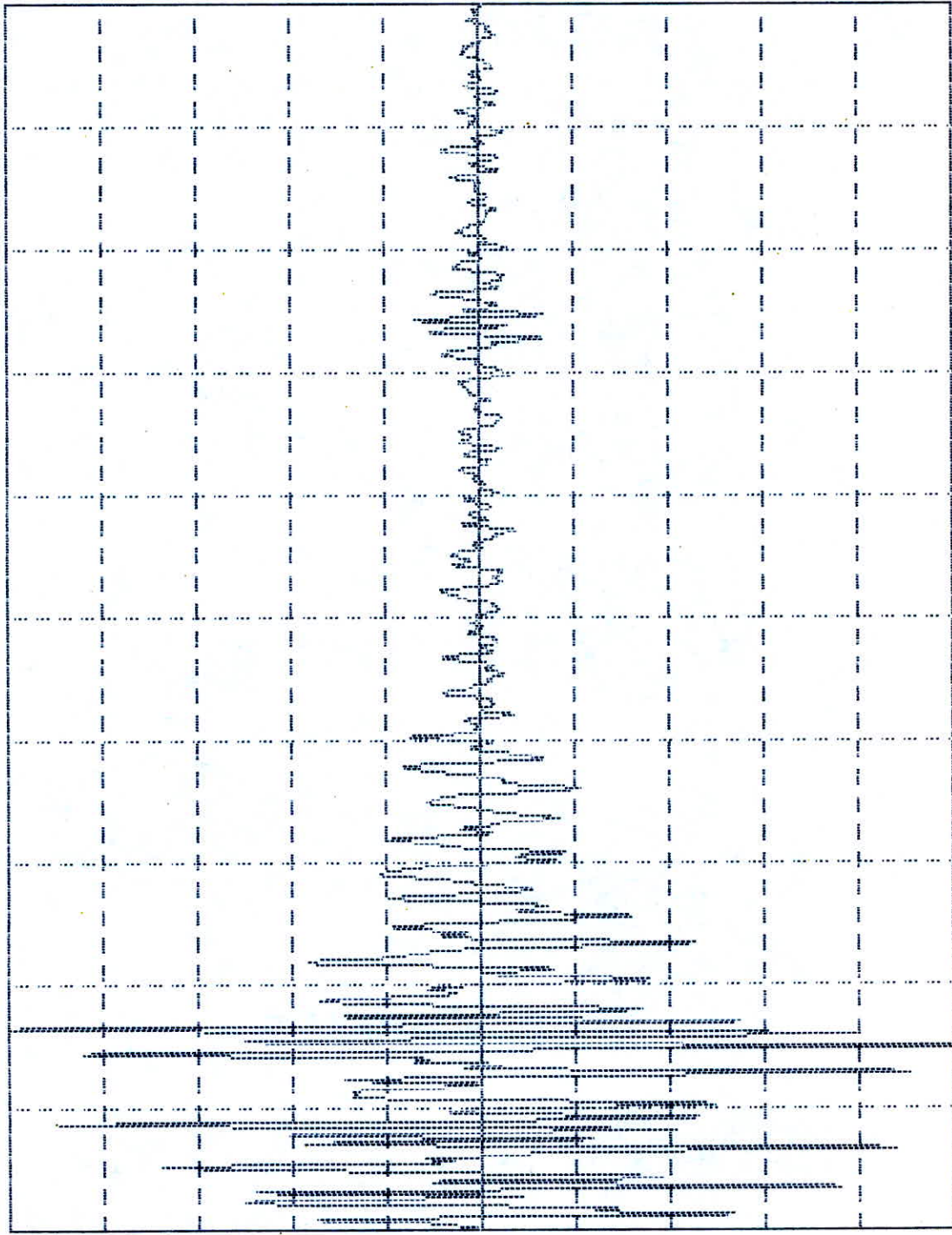


ECH : 1 0 0 0 0

GRAPHES DES TEMPERATURES DES NIVEAUX

D E P L A C E M E N T
 3.5
 2.8
 2.1
 1.4
 0.7
 0
 -0.7
 -1.4
 -2.1
 -2.8
 -3.5

● NIVEAU 3

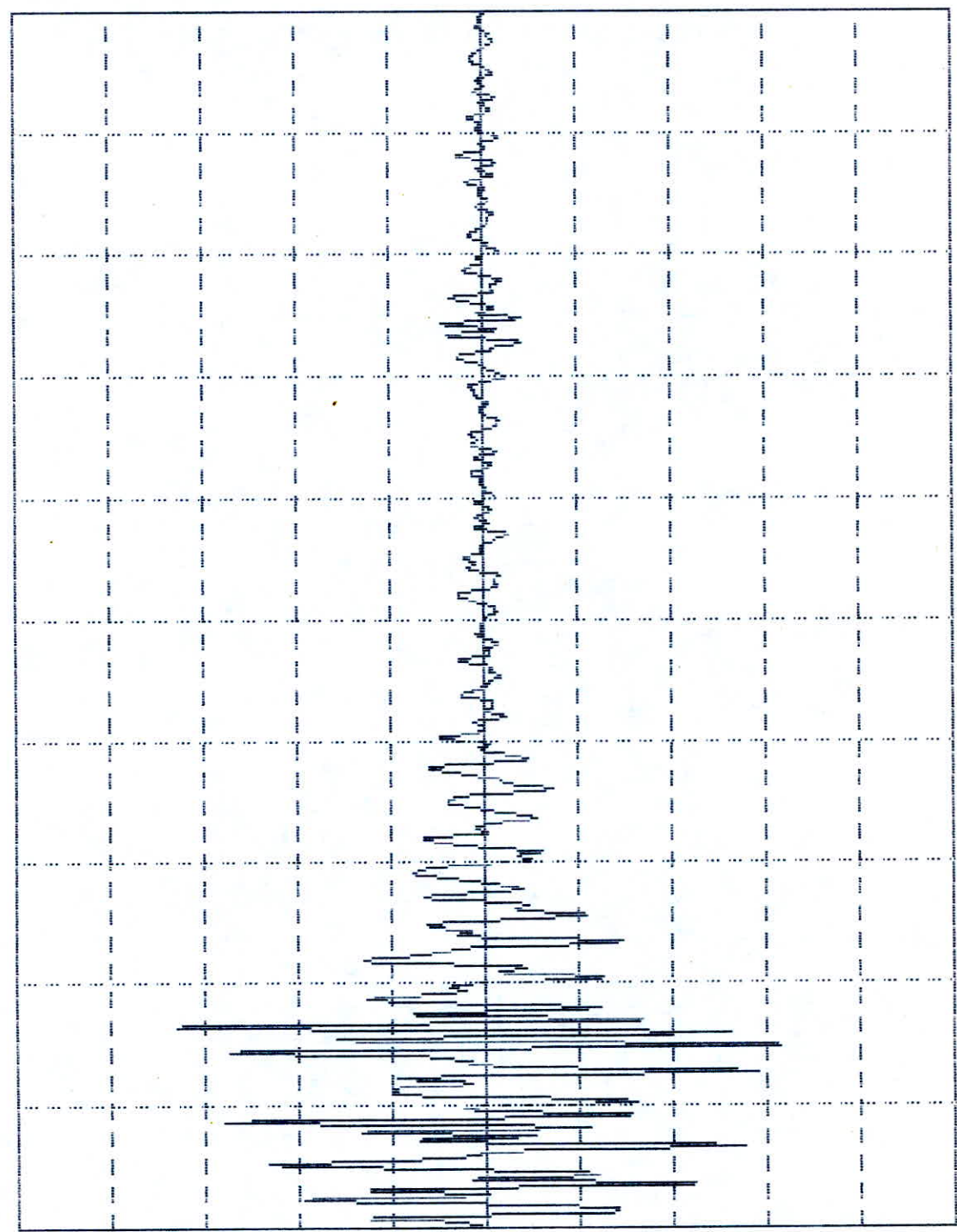


0 4.1 8.2 12.3 16.4 20.5 24.6 28.7 32.8 36.9 41.0

TEMPS

GRAPHES DES TEMPERATURES DES NIVEAUX

● NIVEAU 2



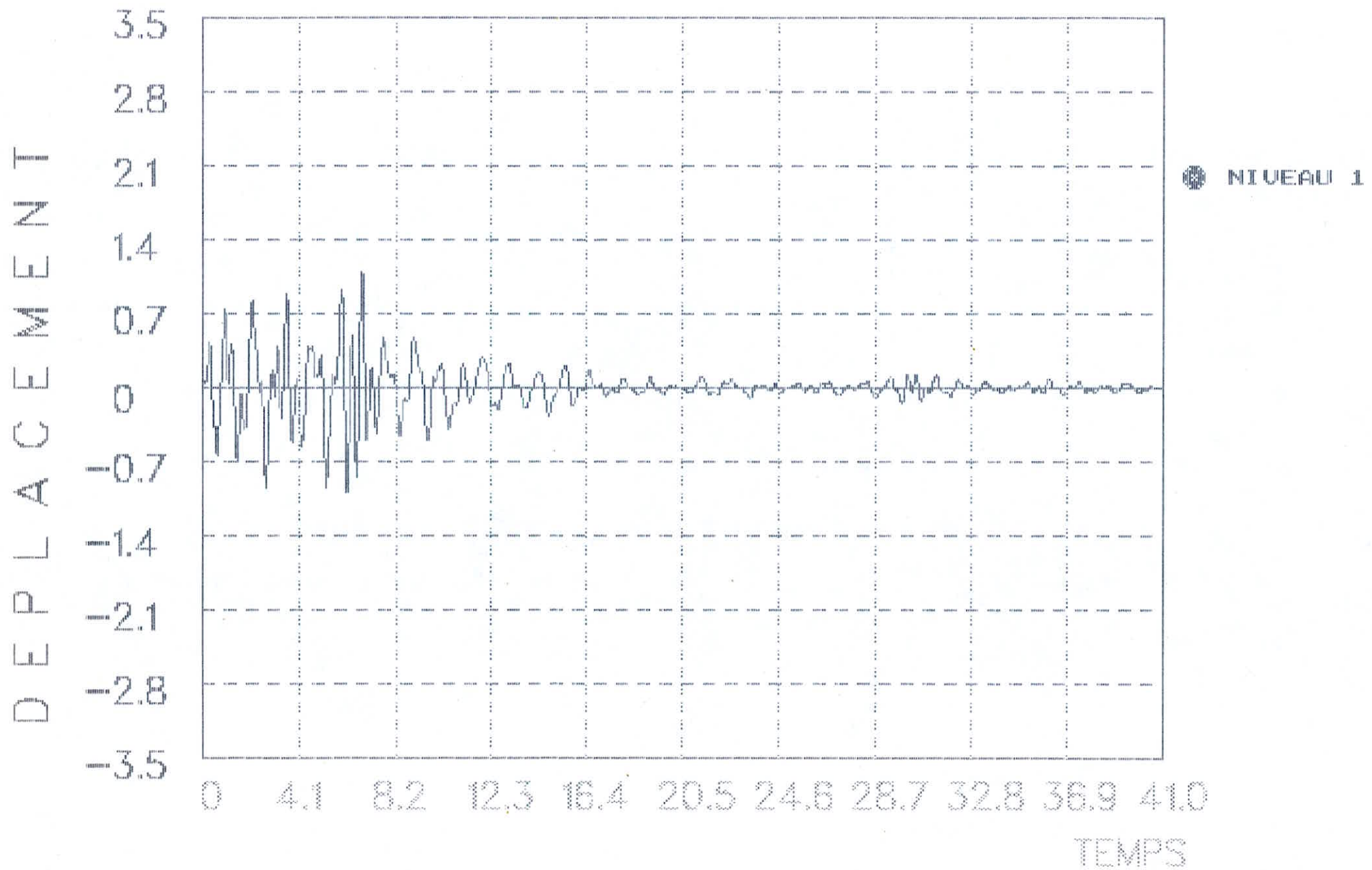
DIFFÉRENT

3.5
2.8
2.1
1.4
0.7
0
-0.7
-1.4
-2.1
-2.8
-3.5

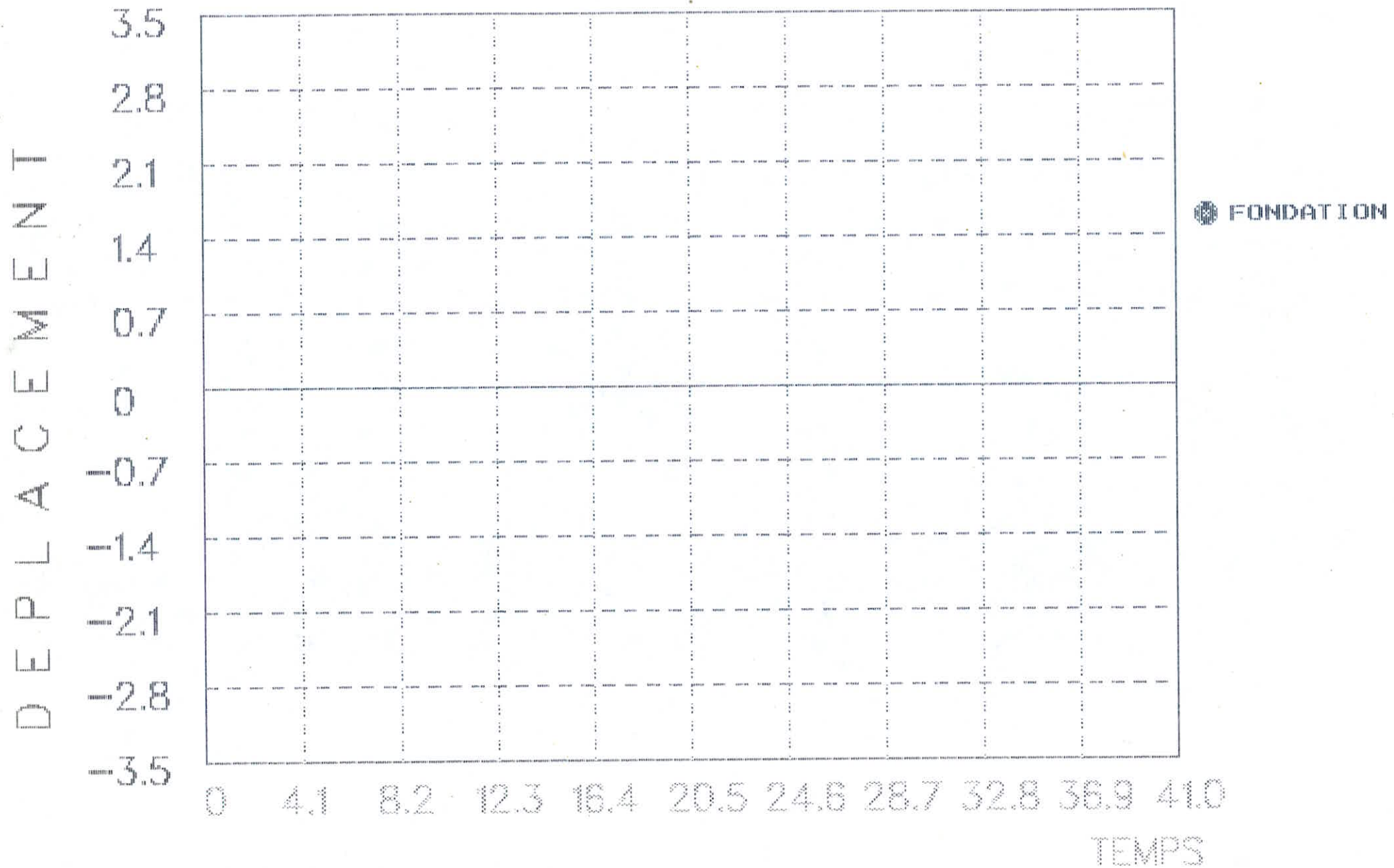
0 4.1 8.2 12.3 16.4 20.5 24.6 28.7 32.8 36.9 41.0

TEMPS

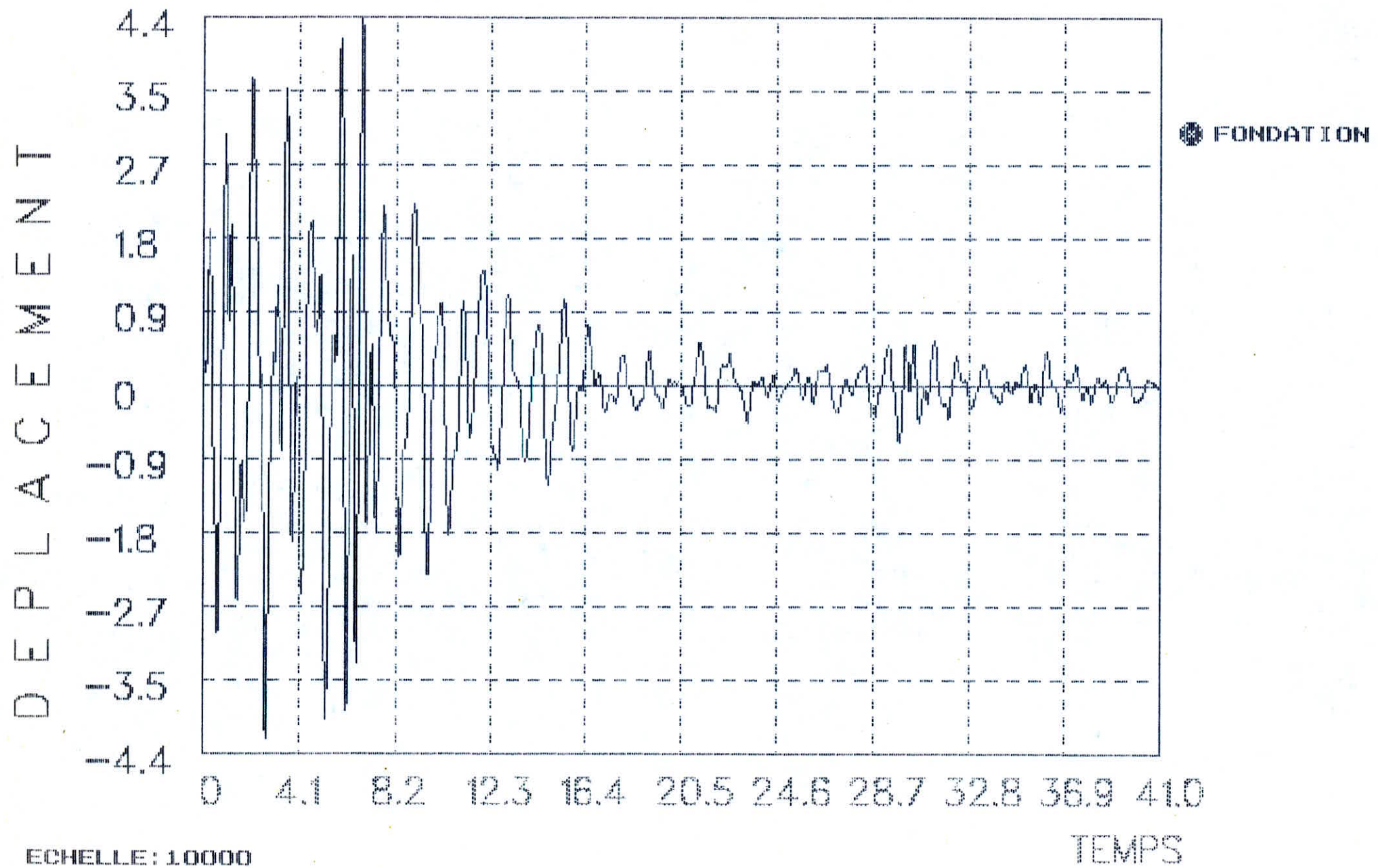
GRAPHES DES DEPLACEMENTS DES NIVEAUX



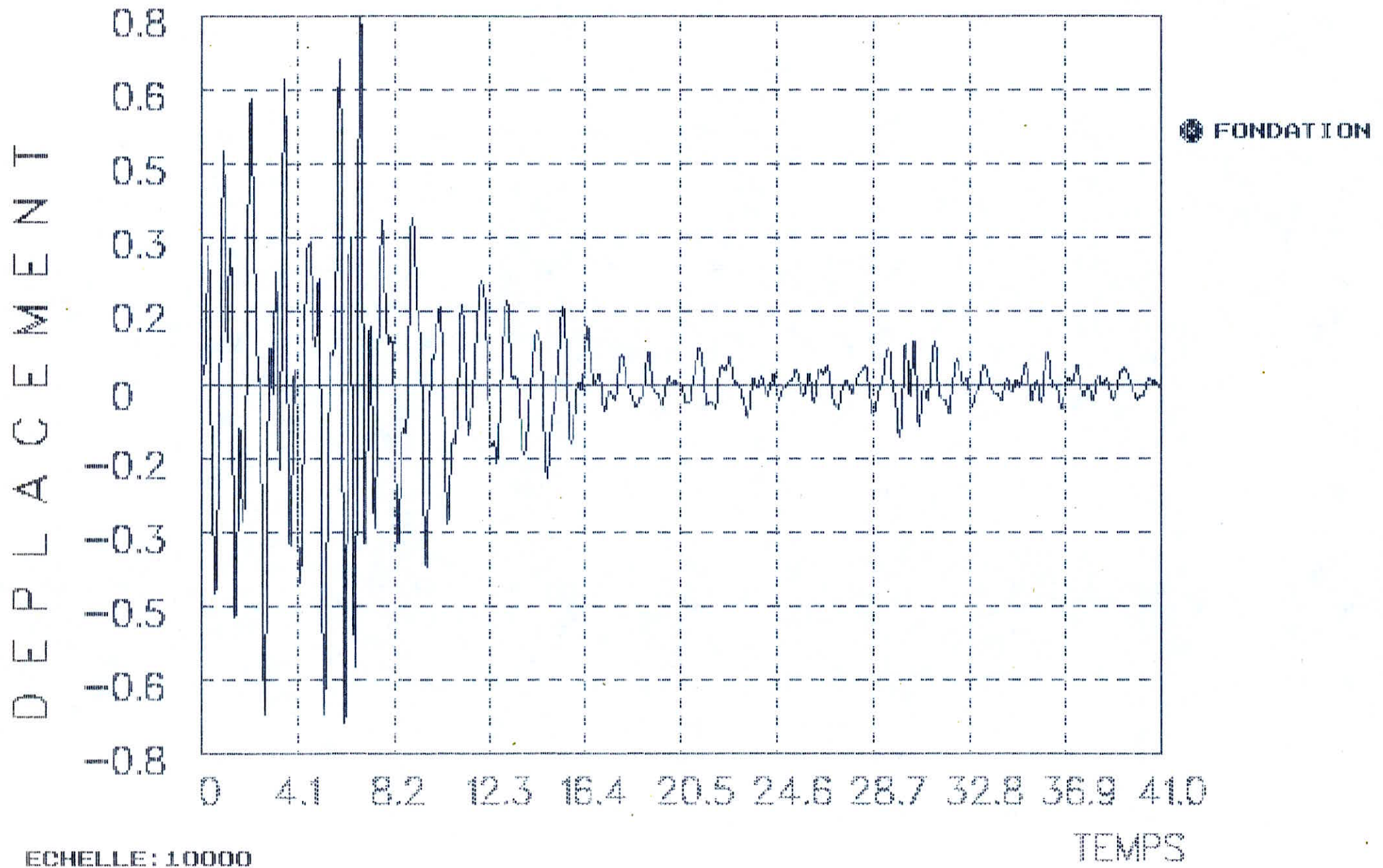
GRAPHES DES DEPLACEMENTS DES NIVEAUX



GRAPHE DE TRANSLATION DE LA FONDATION



GRAPHE DE OSCILLATION DE LA FONDATION



ECHELLE: 10000

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