VISCOELASTIC WAVES IN LAYERED MEDIA

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ERRATA

(Misprints corrected in red font)

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$$\nabla^2 \Phi + k_P^2 \Phi = 0 \tag{3.1.3}$$

$$\nabla^2 \vec{\Psi} + k_S^2 \vec{\Psi} = 0 \tag{3.1.4}$$

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$$K + \frac{4}{3} M = \frac{\rho v_{HP}^2}{2} \left(\frac{1 + \chi_{HP}}{\chi_{HP}^2} \right) \left(1 + i Q_{HP}^{-1} \right), \quad M = \frac{\rho v_{HS}^2}{2} \left(\frac{1 + \chi_{HS}}{\chi_{HS}^2} \right) \left(1 + i Q_{HS}^{-1} \right) \tag{3.6.24}$$

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$$\sqrt{z} \equiv \text{principal value}\left[(z)^{1/2} \right] \equiv \sqrt{|z|} \exp\left[i \frac{\arg z}{2} \right] \tag{4.2.11}$$

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$$\vec{P}_{\phi_j} = k_R \hat{x}_1 + (-1)^j d_{\alpha_R} \hat{x}_3 = \left| \vec{P}_{\phi_j} \right| \left(\sin\left[\theta_{\phi_j} \right] \hat{x}_1 + (-1)^j \cos\left[\theta_{\phi_j} \right] \hat{x}_3 \right), \tag{4.2.34}$$

$$\vec{P}_{\psi_j} = k_R \hat{x}_1 + (-1)^j d_{\beta_R} \hat{x}_3 = \left| \vec{P}_{\psi_j} \right| \left(\sin\left[\theta_{\psi_j} \right] \hat{x}_1 + (-1)^j \cos\left[\theta_{\psi_j} \right] \hat{x}_3 \right), \tag{4.2.35}$$

$$\vec{P}_{u_j} = k_R \hat{x}_1 + (-1)^j d_{\beta_R} \hat{x}_3 = \left| \vec{P}_{u_j} \right| \left(\sin\left[\theta_{u_j} \right] \hat{x}_1 + (-1)^j \cos\left[\theta_{u_j} \right] \hat{x}_3 \right), \tag{4.2.36}$$

$$\begin{aligned} \vec{A}_{\phi_j} &= -k_I \hat{x}_1 + (-1)^{j+1} d_{\alpha_I} \hat{x}_3 \\ &= \left| \vec{A}_{\phi_j} \right| \left(\sin\left[\theta_{\phi_j} - \gamma_{\phi_j} \right] \hat{x}_1 + (-1)^j \cos\left[\theta_{\phi_j} - \gamma_{\phi_j} \right] \hat{x}_3 \right) \end{aligned} \tag{4.2.37}$$

$$\begin{aligned} \vec{A}_{\psi_j} &= -k_I \hat{x}_1 + (-1)^{j+1} d_{\beta_I} \hat{x}_3 \\ &= \left| \vec{A}_{\psi_j} \right| \left(\sin\left[\theta_{\psi_j} - \gamma_{\psi_j} \right] \hat{x}_1 + (-1)^j \cos\left[\theta_{\psi_j} - \gamma_{\psi_j} \right] \hat{x}_3 \right) \end{aligned} \tag{4.2.38}$$

$$\begin{aligned}\vec{A}_{u_j} &= -k_I\,\hat{x}_1 + (-1)^{j+1} d_{\beta_I}\,\hat{x}_3 \\ &= \left|\vec{A}_{u_j}\right| \left(\sin\left[\theta_{u_j} - \gamma_{u_j}\right]\hat{x}_1 + (-1)^{j} \cos\left[\theta_{u_j} - \gamma_{u_j}\right]\hat{x}_3 \right).\end{aligned} \quad (4.2.39)$$

$$\vec{P}'_{\phi_j} = k_R\,\hat{x}_1 + (-1)^j d'_{\alpha_R}\,\hat{x}_3 = \left|\vec{P}'_{\phi_j}\right| \left(\sin\left[\theta'_{\phi_j}\right]\hat{x}_1 + (-1)^j \cos\left[\theta'_{\phi_j}\right]\hat{x}_3 \right), \quad (4.2.40)$$

$$\vec{P}'_{\psi_j} = k_R\,\hat{x}_1 + (-1)^j d'_{\beta_R}\,\hat{x}_3 = \left|\vec{P}'_{\psi_j}\right| \left(\sin\left[\theta'_{\psi_j}\right]\hat{x}_1 + (-1)^j \cos\left[\theta'_{\psi_j}\right]\hat{x}_3 \right), \quad (4.2.41)$$

$$\vec{P}'_{u_j} = k_R\,\hat{x}_1 + (-1)^j d'_{\beta_R}\,\hat{x}_3 = \left|\vec{P}'_{u_j}\right| \left(\sin\left[\theta'_{u_j}\right]\hat{x}_1 + (-1)^j \cos\left[\theta'_{u_j}\right]\hat{x}_3 \right), \quad (4.2.41)$$

$$\begin{aligned}\vec{A}'_{\phi_j} &= -k_I\hat{x}_1 + (-1)^{j+1} d'_{\alpha_I}\,\hat{x}_3 \\ &= \left|\vec{A}'_{\phi_j}\right| \left(\sin\left[\theta'_{\phi_j} - \gamma'_{\phi_j}\right]\hat{x}_1 + (-1)^{j} \cos\left[\theta'_{\phi_j} - \gamma'_{\phi_j}\right]\hat{x}_3 \right),\end{aligned} \quad (4.2.43)$$

$$\begin{aligned}\vec{A}'_{\psi_j} &= -k_I\,\hat{x}_1 + (-1)^{j+1} d'_{\beta_I}\,\hat{x}_3 \\ &= \left|\vec{A}'_{\psi_j}\right| \left(\sin\left[\theta'_{\psi_j} - \gamma'_{\psi_j}\right]\hat{x}_1 + (-1)^{j} \cos\left[\theta'_{\psi_j} - \gamma'_{\psi_j}\right]\hat{x}_3 \right),\end{aligned} \quad (4.2.44)$$

$$\begin{aligned}\vec{A}'_{u_j} &= -k_I\,\hat{x}_1 + (-1)^{j+1} d'_{\beta_I}\,\hat{x}_3 \\ &= \left|\vec{A}'_{u_j}\right| \left(\sin\left[\theta'_{u_j} - \gamma'_{u_j}\right]\hat{x}_1 + (-1)^{j} \cos\left[\theta'_{u_j} - \gamma'_{u_j}\right]\hat{x}_3 \right).\end{aligned} \quad (4.2.45)$$

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$$\vec{P}_{\psi_1} = k_R\,\hat{x}_1 - d_{\beta_R}\,\hat{x}_3 = \left|\vec{P}_{\psi_1}\right| \left(\sin\left[\theta_{\psi_1}\right]\hat{x}_1 - \cos\left[\theta_{\psi_1}\right]\hat{x}_3 \right), \quad (5.2.5)$$

$$\vec{A}_{\psi_1} = -k_I\,\hat{x}_1 + d_{\beta_I}\,\hat{x}_3 = \left|\vec{A}_{\psi_1}\right| \left(\sin\left[\theta_{\psi_1} - \gamma_{\psi_1}\right]\hat{x}_1 - \cos\left[\theta_{\psi_1} - \gamma_{\psi_1}\right]\hat{x}_3 \right), \quad (5.2.6)$$

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$$k_R = \left|\vec{P}_{\psi_1}\right| \sin\theta_{\psi_1} = \left|\vec{P}_{\psi_2}\right| \sin\theta_{\psi_2} = \left|\vec{P}_{\phi_2}\right| \sin\theta_{\phi_2} = \left|\vec{P}'_{\psi_1}\right| \sin\theta'_{\psi_1} = \left|\vec{P}'_{\phi_1}\right| \sin\theta'_{\phi_1} \quad (5.2.19)$$

$$\frac{k_R}{\omega} = \frac{\sin\theta_{\psi_1}}{\left|\vec{v}_{\psi_1}\right|} = \frac{\sin\theta_{\psi_2}}{\left|\vec{v}_{\psi_2}\right|} = \frac{\sin\theta_{\phi_2}}{\left|\vec{v}_{\phi_2}\right|} = \frac{\sin\theta'_{\psi_1}}{\left|\vec{v}'_{\psi_1}\right|} = \frac{\sin\theta'_{\phi_1}}{\left|\vec{v}'_{\phi_1}\right|} \quad (5.2.20)$$

$$\begin{aligned}-k_I &= \left|\vec{A}_{\psi_1}\right| \sin\left[\theta_{\psi_1} - \gamma_{\psi_1}\right] = \left|\vec{A}_{\psi_2}\right| \sin\left[\theta_{\psi_2} - \gamma_{\psi_2}\right] = \left|\vec{A}_{\phi_2}\right| \sin\left[\theta_{\phi_2} - \gamma_{\phi_2}\right] \\ &= \left|\vec{A}'_{\psi_1}\right| \sin\left[\theta'_{\psi_1} - \gamma'_{\psi_1}\right] = \left|\vec{A}'_{\phi_1}\right| \sin\left[\theta'_{\phi_1} - \gamma'_{\phi_1}\right]\end{aligned} \quad (5.2.21)$$

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Theorem (5.2.44). For the problem of a general P *wave incident on a welded viscoelastic boundary,*

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$$\vec{P}_{\phi_1} = k_R\,\hat{x}_1 - d_{\alpha_R}\,\hat{x}_3 = \left|\vec{P}_{\phi_1}\right|\left(\sin\left[\theta_{\phi_1}\right]\hat{x}_1 - \cos\left[\theta_{\phi_1}\right]\hat{x}_3\right) \tag{5.3.5}$$

$$\vec{A}_{\phi_1} = -k_I\,\hat{x}_1 + d_{\alpha_I}\,\hat{x}_3 = \left|\vec{A}_{\phi_1}\right|\left(\sin\left[\theta_{\phi_1} - \gamma_{\phi_1}\right]\hat{x}_1 - \cos\left[\theta_{\phi_1} - \gamma_{\phi_1}\right]\hat{x}_3\right), \tag{5.3.6}$$

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$$k_R = \left|\vec{P}_{\phi_1}\right|\sin\theta_{\phi_1} = \left|\vec{P}_{\psi_2}\right|\sin\theta_{\psi_2} = \left|\vec{P}_{\phi_2}\right|\sin\theta_{\phi_2} = \left|\vec{P}'_{\psi_1}\right|\sin\theta'_{\psi_1} = \left|\vec{P}'_{\phi_1}\right|\sin\theta'_{\phi_1} \tag{5.3.13}$$

$$\frac{k_R}{\omega} = \frac{\sin\theta_{\phi_1}}{\left|\vec{v}_{\phi_1}\right|} = \frac{\sin\theta_{\psi_2}}{\left|\vec{v}_{\psi_2}\right|} = \frac{\sin\theta_{\phi_2}}{\left|\vec{v}_{\phi_2}\right|} = \frac{\sin\theta'_{\psi_1}}{\left|\vec{v}'_{\psi_1}\right|} = \frac{\sin\theta'_{\phi_1}}{\left|\vec{v}'_{\phi_1}\right|} \tag{5.3.14}$$

$$\begin{aligned} -k_I &= \left|\vec{A}_{\phi_1}\right|\sin\left[\theta_{\phi_1} - \gamma_{\phi_1}\right] = \left|\vec{A}_{\psi_2}\right|\sin\left[\theta_{\psi_2} - \gamma_{\psi_2}\right] = \left|\vec{A}_{\phi_2}\right|\sin\left[\theta_{\phi_2} - \gamma_{\phi_2}\right] \\ &= \left|\vec{A}'_{\psi_1}\right|\sin\left[\theta'_{\psi_1} - \gamma'_{\psi_1}\right] = \left|\vec{A}'_{\phi_1}\right|\sin\left[\theta'_{\phi_1} - \gamma'_{\phi_1}\right] \end{aligned} \tag{5.3.15}$$

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$$\vec{P}_{u_1} = k_R\,\hat{x}_1 - d_{\beta_R}\,\hat{x}_3 = \left|\vec{P}_{u_1}\right|\left(\sin\left[\theta_{u_1}\right]\hat{x}_1 - \cos\left[\theta_{u_1}\right]\hat{x}_3\right) \tag{5.4.4}$$

$$\vec{A}_{u_1} = -k_I\,\hat{x}_1 + d_{\beta_I}\,\hat{x}_3 = \left|\vec{A}_{u_1}\right|\left(\sin\left[\theta_{u_1} - \gamma_{u_1}\right]\hat{x}_1 - \cos\left[\theta_{u_1} - \gamma_{u_1}\right]\hat{x}_3\right), \tag{5.4.5}$$

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$$k_R = \left|\vec{P}_{u_1}\right|\sin\theta_{u_1} = \left|\vec{P}_{u_2}\right|\sin\theta_{u_2} = \left|\vec{P}'_{u_1}\right|\sin\theta'_{u_1} \tag{5.4.12}$$

$$\frac{k_R}{\omega} = \frac{\sin\theta_{u_1}}{\left|\vec{v}_{u_1}\right|} = \frac{\sin\theta_{u_2}}{\left|\vec{v}_{u_2}\right|} = \frac{\sin\theta'_{u_1}}{\left|\vec{v}'_{u_1}\right|} \tag{5.4.13}$$

$$-k_I = \left|\vec{A}_{u_1}\right|\sin\left[\theta_{u_1} - \gamma_{u_1}\right] = \left|\vec{A}_{u_2}\right|\sin\left[\theta_{u_2} - \gamma_{u_2}\right] = \left|\vec{A}'_{u_1}\right|\sin\left[\theta'_{u_1} - \gamma'_{u_1}\right] \tag{5.4.14}$$

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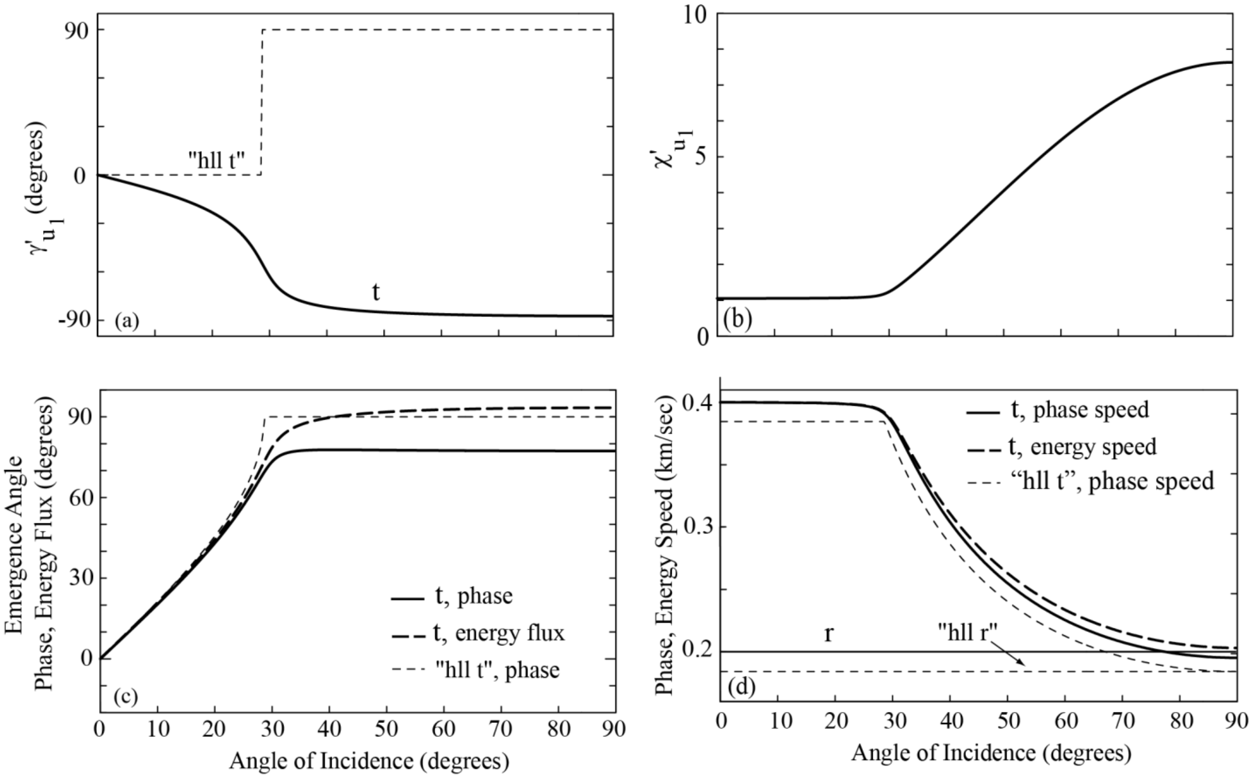

Note ordinate scale correction (d).

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$$d_{\beta m} = principal\ value\sqrt{k_{Sm}^2 - k^2} \quad (9.1.6)$$

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Chapter 3

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$$u(t) = D_1 \exp\left[i\left(\omega t - \left(\vec{P}_{u_1} - i\,\vec{A}_{u_1}\right)\bullet\vec{r}\right)\right] + D_2 \exp\left[i\left(\omega t - \left(\vec{P}_{u_2} - i\,\vec{A}_{u_2}\right)\bullet\vec{r}\right)\right] \quad (11.3.21)$$