

Appendices

Appendix (I)

$$\begin{aligned}
 H_1 &= \frac{\tilde{R}_p \omega_1 l \tilde{\gamma} \tilde{\mu}}{(\omega_1 \tilde{c}_p \tilde{R}_p - i)}, \\
 H_2 &= \frac{2\omega^2(4-7\omega^2)}{(4\omega^2-1)}, \\
 H_3 &= \frac{\omega^2(24\omega^4-5\omega^2-1)}{2(4\omega^2-1)}, \\
 H_4 &= \frac{\omega^2(\omega+2)(3\omega+2)}{(2\omega+1)}, \\
 H_5 &= \frac{\omega^2[(8-3\omega)\omega-4]}{(2\omega-1)}, \\
 H_6 &= -\frac{\omega(\omega+1)(\omega+2)(\omega+3)}{(2\omega+1)}, \\
 H_7 &= \frac{\omega(\omega-1)(\omega-2)(\omega-3)}{(2\omega-1)}, \\
 H_8 &= \frac{\omega^2(67\omega^2-1)}{(24\omega^2-6)}, \\
 H_9 &= \frac{\mu l \rho c_L R_L^2 \omega_1^2}{(1+\omega_1^2 c_L^2 R_L^2)}, \\
 H_{10} &= \frac{\mu l \rho R_L \omega_1}{(1+\omega_1^2 c_L^2 R_L^2)}.
 \end{aligned}$$

Appendix (II)

$$\begin{aligned}
 \Gamma_1 &= \frac{1}{2}(c_1 + c_2 + G_1 + G_2 + H_{10} + \frac{f_2 \sin \eta_{20}}{\omega q_{20}} + \frac{1}{2} f_1 \sin \eta_{10}), \\
 \Gamma_2 &= \frac{1}{\omega^2 q_{20}} \{ \omega \sin \eta_{20} f_2 [0.125 f_1 \sin \eta_{10} + 0.25 G_1 + 0.25 G_2 + 0.25 H_{10}] + \omega c_1 [0.25 f_2 \sin \eta_{20} \\
 &\quad + \omega(0.25 c_2 + 0.25 f_1 \sin \eta_{10} + 0.25 G_2) q_{20}] + \omega c_2 [0.25 f_2 \sin \eta_{20} + \omega(0.125 f_1 \sin \eta_{10} \\
 &\quad + 0.25 G_1 + 0.25 H_{10}) q_{20}] + \omega^2 q_{20} \{ -0.125 f_1^2 + G_2(0.25 G_1 + 0.25 H_{10}) + f_1 [(0.25 G_1 \\
 &\quad + 0.125 G_2 + 0.25 H_{10}) \sin \eta_{10} + (0.25 H_9 - 0.0625 H_2 q_{20}^2 - 0.25 \sigma_1) \cos \eta_{10}] \} \\
 &\quad + (-0.0625 H_2 q_{10}^2 - 0.1875 H_3 q_{20}^2 - 0.5 \omega \sigma_2) f_2 \cos \eta_{20} \},
 \end{aligned}$$

$$\begin{aligned}
\Gamma_3 = & \frac{1}{\omega^2 q_{20}} \{ \omega f_2 \sin \eta_{20} \{ -0.0625 f_1^2 + G_2 (0.125 G_1 + 0.125 H_{10}) + c_2 (0.0625 f_1 \sin \eta_{10} \\
& + 0.125 G_1 + 0.125 H_{10}) + f_1 [\sin \eta_{10} (0.125 G_1 + 0.0625 G_2 + 0.125 H_{10}) + \cos \eta_{10} (0.125 H_9 \\
& - 0.03125 H_2 q_{20}^2 - 0.125 \sigma_1)] \} + \omega^2 f_1 (c_2 + G_2) q_{20} [\sin \eta_{10} (0.125 G_1 + 0.125 H_{10}) - 0.0625 f_1 \\
& + \cos \eta_{10} (0.125 H_9 - 0.03125 H_2 q_{20}^2 - 0.125 \sigma_1)] + f_2 \cos \eta_{20} [(G_1 + H_{10}) (-0.03125 H_2 q_{10}^2 \\
& - 0.09375 H_3 q_{20}^2 - 0.25 \omega \sigma_2) + f_1 \sin \eta_{10} (-0.015625 H_2 q_{10}^2 - 0.046875 H_3 q_{20}^2 - 0.125 \omega \sigma_2)] \\
& + c_1 \{ \omega c_2 (0.125 f_2 \sin \eta_{20} + 0.125 \omega f_1 q_{20} \sin \eta_{10}) + \omega f_1 \sin \eta_{10} (0.125 \sin \eta_{20} f_2 + 0.125 \omega G_2 q_{20}) \\
& + f_2 [0.125 \omega G_2 \sin \eta_{20} + \cos \eta_{20} (-0.03125 H_2 q_{10}^2 - 0.09375 H_3 q_{20}^2 - 0.25 \omega \sigma_2)] \} \}, \\
\Gamma_4 = & \frac{1}{\omega^2 q_{20}} f_1 f_2 \{ \omega \sin \eta_{20} \{ c_1 \sin \eta_{10} (0.0625 c_2 + 0.0625 G_2) + (c_2 + G_2) [-0.03125 f_1 + \sin \eta_{10} \\
& \times (0.0625 G_1 + 0.0625 H_{10}) + \cos \eta_{10} (0.0625 H_9 - 0.015625 H_2 q_{20}^2 - 0.0625 \sigma_1)] \} + \cos \eta_{20} \\
& \times \{ c_1 \sin \eta_{10} (-0.015625 H_2 q_{10}^2 - 0.046875 H_3 q_{20}^2 - 0.125 \omega \sigma_2) + (G_1 + H_{10}) \sin \eta_{10} (-0.015625 \\
& \times H_2 q_{10}^2 - 0.046875 H_3 q_{20}^2 - 0.125 \omega \sigma_2) + f_1 (0.0078125 H_2 q_{10}^2 + 0.0234375 H_3 q_{20}^2 + 0.0625 \\
& \times \omega \sigma_2) + \cos \eta_{10} [H_2 q_{10}^2 (-0.015625 H_9 - 0.01171875 H_2 q_{20}^2 + 0.015625 \sigma_1) + H_3 q_{20}^2 (-0.046875 \\
& \times H_9 + 0.01171875 H_2 q_{20}^2 + 0.046875 \sigma_1) + \omega (-0.125 H_9 + 0.03125 H_2 q_{20}^2 + 0.125 \sigma_1) \sigma_2 \} \} \}.
\end{aligned}$$