

Appendix A

Coefficients 1

$$\begin{aligned}
A_1 &= -ik, A_2 = -\omega_r - i\omega_i, A_3 = \frac{-ik\alpha}{\beta}, A_4 = \frac{(\alpha-\beta)(\alpha+\beta)(\omega_r+i\omega_i)}{\beta}, \\
A_5 &= \frac{1-(\omega_r+i\omega_i)\tau_q}{K_0(-1+(\omega_r+i\omega_i)\tau_\theta)}, A_6 = -\frac{(\omega_r+i\omega_i)}{\beta_1}, A_7 = -\frac{\beta_4(-1+(\omega_r+i\omega_i)\tau_q)}{K_0(-1+(\omega_r+i\omega_i)\tau_\theta)}, \\
A_8 &= -\frac{k^2}{\beta(\omega_r+i\omega_i)} - \frac{(\omega_r+i\omega_i)}{\beta_1}, A_9 = ik\beta_4, A_{11} = \left((\omega_r + i\omega_i) - \frac{k^2 K_0(-1+(\omega_r+i\omega_i)\tau_q)}{-1+(\omega_r+i\omega_i)\tau_q} \right), \\
A_{10} &= \frac{(\alpha-\beta)\beta_2(ik)}{\beta}, A_{12} = \frac{(-\alpha+\beta)(\alpha+\beta)(\omega_r+i\omega_i)\beta_2}{\beta}, A_{13} = \frac{k}{\beta(i\omega_r-\omega_i)}, A_{14} = \frac{\alpha}{\beta}, \\
A_{15} &= \frac{kK_0(i+(-i\omega_r+\omega_i)\tau_\theta)}{-1+(\omega_r+i\omega_i)\tau_q}, A_{16} = -i2k, A_{17} = -2(\omega_r + i\omega_i), A_{18} = -\frac{i2k\alpha}{\beta}, \\
A_{19} &= (-2\beta(\omega_r + i\omega_i)) + \frac{\alpha(2\alpha(\omega_r+i\omega_i))}{\beta}, A_{20} = \frac{(1-2(\omega_r+i\omega_i)\tau_q)}{K_0(-1+2(\omega_r+i\omega_i)\tau_\theta)}, \\
A_{21} &= -\frac{2(\omega_r+i\omega_i)}{\beta_1}, A_{22} = \frac{\beta_4(1-2(\omega_r+i\omega_i)\tau_q)}{K_0(-1+2(\omega_r+i\omega_i)\tau_\theta)}, A_{23} = -\frac{2k^2}{\beta(\omega_r+i\omega_i)} - \frac{2(\omega_r+i\omega_i)}{\beta_1}, \\
A_{24} &= 2ik\beta_4, A_{25} = \frac{2ik(\alpha-\beta)\beta_2}{\beta}, A_{26} = 2(\omega_r + i\omega_i) - \frac{4k^2 K_0(-1+2(\omega_r+i\omega_i)\tau_\theta)}{-1+2(\omega_r+i\omega_i)\tau_q}, \\
A_{27} &= -\frac{2\beta_2(\alpha-\beta)(\alpha+\beta)(\omega_r+i\omega_i)}{\beta}, A_{28} = -\frac{ik}{\beta(\omega_r+i\omega_i)}, A_{29} = \frac{\alpha}{\beta}, \\
A_{30} &= \frac{2kK_0(1+\tau_\theta(-2i\omega_i-2\omega_r))}{i+2\tau_q(\omega_i-i\omega_r)}, A_{31} = \eta \frac{1}{2} \left(-1 + \frac{1}{-1+2\tau_\theta(i\omega_i+\omega_r)} \right), A_{32} = \eta \frac{1}{2} \beta_4 \left(-1 + \frac{1}{-1+2\tau_\theta(i\omega_i+\omega_r)} \right), \\
A_{33} &= -\eta \frac{2k^2 K_0(-1+\tau_\theta(i\omega_i+\omega_r))}{-1+2\tau_q(i\omega_i+\omega_r)}, A_{34} = \eta \frac{kK_0(1+\tau_\theta(-i\omega_i-\omega_r))}{i+2\tau_q(\omega_i-i\omega_r)}, \\
A &= (2A_1A_3 + A_{11}A_5 + A_4A_6 + A_{12}A_7 + A_2A_8), \\
B &= A_1^2 (A_3^2 - A_4A_8) + A_4A_5A_6A_{11} + A_1 (2A_3A_5A_{11} - A_4A_7A_{10} + (A_3A_7 - A_5A_9)A_{12}) \\
&\quad - A_2 (A_3^2A_6 + A_3A_7A_{10} + A_5A_9A_{10} - A_8(A_4A_6 + A_5A_{11} + A_7A_{12})), \\
C &= A_5 (A_1^2 - A_2A_6) (A_{11} (A_3^2 - A_4A_8) - A_{12}A_3A_9 + A_{10}A_4A_9), \\
C_1 &= (2A_{16}A_{18} + A_{26}A_{20} + A_{19}A_{21} + A_{27}A_{22} + A_{17}A_{24}), \\
C_2 &= A_{26}A_{19}A_{20}A_{21} + A_{16}^2 (A_{18}^2 - A_{19}A_{24}) \\
&\quad - A_{17} (A_{18}^2A_{21} + A_{25}A_{18}A_{22} - (A_{26}A_{20} + A_{19}A_{21} + A_{27}A_{22})A_{24} + A_{25}A_{20}A_{24}) \\
&\quad + A_{16} (2A_{26}A_{18}A_{20} + A_{27}A_{18}A_{22} - A_{25}A_{19}A_{22} - A_{27}A_{20}A_{24}), \\
C_3 &= A_{20} (A_{16}^2 - A_{17}A_{21}) (A_{26} (A_{18}^2 - A_{19}A_{23}) - A_{27}A_{18}A_{24} + A_{25}A_{19}A_{24}).
\end{aligned}$$

Appendix B

Coefficients 2

$$\begin{aligned}
v_{1nh} &= \frac{A_1^2 A_4 A_5 A_9 - A_2 A_4 A_5 A_6 A_9 + A_2 A_3 A_7 \xi_{nh}^2 + A_1 A_4 A_7 \xi_{nh}^2 + A_2 A_5 A_9 \xi_{nh}^2}{A_5 \Delta_{nh}}, \\
v_{2nh} &= \frac{\xi_{nh}(-A_2 A_3^2 A_7 + A_2 A_4 A_7 A_8 - A_2 A_3 A_5 A_9 - A_1 A_4 A_5 A_9 - A_4 A_7 \xi_{nh}^2)}{A_5 \Delta_{nh}}, \\
v_{3nh} &= 1.0 \\
v_{4nh} &= \frac{-A_1^2 A_3 A_5 A_9 + A_2 A_3 A_5 A_6 A_9 - A_1 A_3 A_7 \xi_{nh}^2 - A_2 A_7 A_8 \xi_{nh}^2 + A_1 A_5 A_9 \xi_{nh}^2 + A_7 \xi_{nh}^4}{A_5 \Delta_{nh}}, \\
v_{5nh} &= \frac{\xi_{nh}(-A_1 A_3^2 A_7 + A_1 A_4 A_7 A_8 - A_1 A_3 A_5 A_9 - A_4 A_5 A_6 A_9 + A_3 A_7 \xi_{nh}^2 + A_5 A_9 \xi_{nh}^2)}{A_5 \Delta_{nh}}, \\
v_{6nh} &= \frac{-\xi_{nh}}{A_5}, \\
\Delta_{nh} &= A_1^2 A_3^2 - A_2 A_3^2 A_6 - A_1^2 A_4 A_8 + A_2 A_4 A_6 A_8 - 2A_1 A_3 \xi_{nh}^2 - A_4 A_6 \xi_{nh}^2 - A_2 A_8 \xi_{nh}^2 + \xi_{nh}^4.
\end{aligned}$$

Appendix C

Coefficients 3

$$\begin{aligned}
v_{1ns} &= \frac{A_1^2 A_4 A_5 A_9 - A_2 A_4 A_5 A_6 A_9 + A_2 A_3 A_7 \xi_{ns}^2 + A_1 A_4 A_7 \xi_{ns}^2 + A_2 A_5 A_9 \xi_{ns}^2}{A_5 \Delta_{ns}}, \\
v_{2ns} &= \frac{\xi_{ns}(-A_2 A_3^2 A_7 + A_2 A_4 A_7 A_8 - A_2 A_3 A_5 A_9 - A_1 A_4 A_5 A_9 - A_4 A_7 \xi_{ns}^2)}{A_5 \Delta_{ns}}, \\
v_{3ns} &= 1.0 \\
v_{4ns} &= \frac{-A_1^2 A_3 A_5 A_9 + A_2 A_3 A_5 A_6 A_9 - A_1 A_3 A_7 \xi_{ns}^2 - A_2 A_7 A_8 \xi_{ns}^2 + A_1 A_5 A_9 \xi_{ns}^2 + A_7 \xi_{ns}^4}{A_5 \Delta_{ns}}, \\
v_{5ns} &= \frac{\xi_{ns}(-A_1 A_3^2 A_7 + A_1 A_4 A_7 A_8 - A_1 A_3 A_5 A_9 - A_4 A_5 A_6 A_9 + A_3 A_7 \xi_{ns}^2 + A_5 A_9 \xi_{ns}^2)}{A_5 \Delta_{ns}}, \\
v_{6ns} &= \frac{-\xi_{ns}}{A_5}, \\
V_{1ns} &= \frac{A_1^2 A_4 A_5 A_9 - A_2 A_4 A_5 A_6 A_9 + A_2 A_3 A_7 \xi_{ns}^2 + A_1 A_4 A_7 \xi_{ns}^2 + A_2 A_5 A_9 \xi_{ns}^2}{A_5 \Delta_{ns}}, \\
V_{2ns} &= \frac{\xi_{ns}(A_2 A_3^2 A_7 - A_2 A_4 A_7 A_8 + A_2 A_3 A_5 A_9 + A_1 A_4 A_5 A_9 - A_4 A_7 \xi_{ns}^2)}{A_5 \Delta_{ns}}, \\
V_{3ns} &= 1.0 \\
V_{4ns} &= \frac{A_1^2 A_3 A_5 A_9 - A_2 A_3 A_5 A_6 A_9 + A_1 A_3 A_7 \xi_{ns}^2 - A_2 A_7 A_8 \xi_{ns}^2 + A_1 A_5 A_9 \xi_{ns}^2 + A_7 \xi_{ns}^4}{A_5 \Delta_{ns}}, \\
V_{5ns} &= \frac{-\xi_{ns}(-A_1 A_3^2 A_7 + A_1 A_4 A_7 A_8 - A_1 A_3 A_5 A_9 - A_4 A_5 A_6 A_9 + A_3 A_7 \xi_{ns}^2 + A_5 A_9 \xi_{ns}^2)}{A_5 \Delta_{ns}}, \\
V_{6ns} &= \frac{\xi_{ns}}{A_5}, \\
\Delta_{ns} &= A_1^2 A_3^2 - A_2 A_3^2 A_6 - A_1^2 A_4 A_8 + A_2 A_4 A_6 A_8 - 2A_1 A_3 \xi_{ns}^2 - A_4 A_6 \xi_{ns}^2 - A_2 A_8 \xi_{ns}^2 + \xi_{ns}^4.
\end{aligned}$$

Appendix D

Coefficients 4

$$\begin{aligned}
V_{1nh} &= \frac{A_{16}^2 A_{19} A_{20} A_{24} - A_{17} A_{19} A_{20} A_{21} A_{24} + A_{17} A_{18} A_{22} \zeta_{nh}^2 + A_{16} A_{19} A_{22} \zeta_{nh}^2 + A_{17} A_{20} A_{24} \zeta_{nh}^2}{A_{20} \Pi_{nh}}, \\
V_{2nh} &= \frac{\zeta_{nh} (-A_{17} A_{18}^2 A_{22} + A_{17} A_{19} A_{22} A_{23} - A_{17} A_{18} A_{20} A_{24} - A_{16} A_{19} A_{20} A_{24} - A_{19} A_{22} \zeta_{nh}^2)}{A_{20} \Pi_{nh}}, \\
V_{3nh} &= 1.0 \\
V_{4nh} &= \frac{-A_{16}^2 A_{18} A_{20} A_{24} + A_{17} A_{18} A_{20} A_{21} A_{24} - A_{16} A_{18} A_{22} \zeta_{nh}^2 - A_{17} A_{22} A_{23} \zeta_{nh}^2 + A_{16} A_{20} A_{24} \zeta_{nh}^2 + A_{22} \zeta_{nh}^4}{A_{20} \Pi_{nh}}, \\
V_{5nh} &= \frac{\zeta_{nh} (-A_{16} A_{18}^2 A_{22} + A_{16} A_{19} A_{22} A_{23} - A_{16} A_{18} A_{20} A_{24} - A_{19} A_{20} A_{21} A_{24} + A_{18} A_{22} \zeta_{nh}^2 + A_{20} A_{24} \zeta_{nh}^2)}{A_{20} \Pi_{nh}}, \\
V_{6nh} &= \frac{-\zeta_{nh}}{A_{20}}, \\
\Pi_{nh} &= A_{16}^2 A_{18}^2 - A_{17} A_{18}^2 A_{21} - A_{16}^2 A_{19} A_{23} + A_{17} A_{19} A_{21} A_{23} - 2A_{16} A_{18} \zeta_{nh}^2 - A_{19} A_{21} \zeta_{nh}^2 - A_{17} A_{23} \zeta_{nh}^2 + \zeta_{nh}^4.
\end{aligned}$$

Appendix E

Coefficients 5

$$\begin{aligned}
u_{1ns} &= \frac{A_{16}^2 A_{19} A_{20} A_{24} - A_{17} A_{19} A_{20} A_{21} A_{24} + A_{17} A_{18} A_{22} \zeta_{ns}^2 + A_{16} A_{19} A_{22} \zeta_{ns}^2 + A_{17} A_{20} A_{24} \zeta_{ns}^2}{A_{20} \Pi_{ns}}, \\
u_{2ns} &= \frac{\zeta_{ns} (-A_{17} A_{18}^2 A_{22} + A_{17} A_{19} A_{22} A_{23} - A_{17} A_{18} A_{20} A_{24} - A_{16} A_{19} A_{20} A_{24} - A_{19} A_{22} \zeta_{ns}^2)}{A_{20} \Pi_{ns}}, \\
u_{3ns} &= 1.0 \\
u_{4ns} &= \frac{-A_{16}^2 A_{18} A_{20} A_{24} + A_{17} A_{18} A_{20} A_{21} A_{24} - A_{16} A_{18} A_{22} \zeta_{ns}^2 - A_{17} A_{22} A_{23} \zeta_{ns}^2 + A_{16} A_{20} A_{24} \zeta_{ns}^2 + A_{22} \zeta_{ns}^4}{A_{20} \Pi_{ns}}, \\
u_{5ns} &= \frac{\zeta_{ns} (-A_{16} A_{18}^2 A_{22} + A_{16} A_{19} A_{22} A_{23} - A_{16} A_{18} A_{20} A_{24} - A_{19} A_{20} A_{21} A_{24} + A_{18} A_{22} \zeta_{ns}^2 + A_{20} A_{24} \zeta_{ns}^2)}{A_{20} \Pi_{ns}}, \\
u_{6ns} &= \frac{-\zeta_{ns}}{A_{20}}, \\
U_{1ns} &= \frac{-A_{16}^2 A_{19} A_{20} A_{24} + A_{17} A_{19} A_{20} A_{21} A_{24} + A_{17} A_{18} A_{22} \zeta_{ns}^2 + A_{16} A_{19} A_{22} \zeta_{ns}^2 + A_{17} A_{20} A_{24} \zeta_{ns}^2}{A_{20} \Pi_{ns}}, \\
U_{2ns} &= \frac{-\zeta_{ns} (-A_{17} A_{18}^2 A_{22} + A_{17} A_{19} A_{22} A_{23} - A_{17} A_{18} A_{20} A_{24} - A_{16} A_{19} A_{20} A_{24} - A_{19} A_{22} \zeta_{ns}^2)}{A_{20} \Pi_{ns}}, \\
U_{3ns} &= 1.0 \\
U_{4ns} &= \frac{A_{16}^2 A_{18} A_{20} A_{24} - A_{17} A_{18} A_{20} A_{21} A_{24} - A_{16} A_{18} A_{22} \zeta_{ns}^2 - A_{17} A_{22} A_{23} \zeta_{ns}^2 + A_{16} A_{20} A_{24} \zeta_{ns}^2 + A_{22} \zeta_{ns}^4}{A_{20} \Pi_{ns}}, \\
U_{5ns} &= \frac{-\zeta_{ns} (-A_{16} A_{18}^2 A_{22} + A_{16} A_{19} A_{22} A_{23} - A_{16} A_{18} A_{20} A_{24} - A_{19} A_{20} A_{21} A_{24} + A_{18} A_{22} \zeta_{ns}^2 + A_{20} A_{24} \zeta_{ns}^2)}{A_{20} \Pi_{ns}}, \\
u_{6ns} &= \frac{\zeta_{ns}}{A_{20}}, \\
\Pi_{ns} &= A_{16}^2 A_{18}^2 - A_{17} A_{18}^2 A_{21} - A_{16}^2 A_{19} A_{23} + A_{17} A_{19} A_{21} A_{23} - 2A_{16} A_{18} \zeta_{ns}^2 - A_{19} A_{21} \zeta_{ns}^2 - A_{17} A_{23} \zeta_{ns}^2 + \zeta_{ns}^4.
\end{aligned}$$

Appendix F

Coefficients 6

$$\begin{aligned}
\Lambda_1 &= \begin{pmatrix} v_{11s} e^{-\xi_{1s}d} & v_{12s} e^{-\xi_{2s}d} & v_{13s} e^{-\xi_{3s}d} \\ v_{21s} e^{-\xi_{1s}d} & v_{22s} e^{-\xi_{2s}d} & v_{23s} e^{-\xi_{3s}d} \\ v_{51s} e^{-\xi_{1s}d} & v_{52s} e^{-\xi_{2s}d} & v_{53s} e^{-\xi_{3s}d} \end{pmatrix}, \\
\Lambda_2 &= \begin{pmatrix} V_{11s} e^{\xi_{1s}d} & V_{12s} e^{\xi_{2s}d} & V_{13s} e^{\xi_{3s}d} \\ V_{21s} e^{\xi_{1s}d} & V_{22s} e^{\xi_{2s}d} & V_{23s} e^{\xi_{3s}d} \\ V_{51s} e^{\xi_{1s}d} & V_{52s} e^{\xi_{2s}d} & V_{53s} e^{\xi_{3s}d} \end{pmatrix}, \\
\Lambda_3 &= \begin{pmatrix} -v_{11h} e^{-\xi_{1h}d} & -v_{12h} e^{-\xi_{2h}d} & -v_{13h} e^{-\xi_{3h}d} \\ -v_{21h} e^{-\xi_{1h}d} & -v_{22h} e^{-\xi_{2h}d} & -v_{23h} e^{-\xi_{3h}d} \\ -v_{51h} e^{-\xi_{1h}d} & -v_{52h} e^{-\xi_{2h}d} & -v_{53h} e^{-\xi_{3h}d} \end{pmatrix}, \\
\Lambda_4 &= \begin{pmatrix} v_{41s} e^{-\xi_{1s}d} & v_{42s} e^{-\xi_{2s}d} & sv_{43s} e^{-\xi_{3s}d} \\ K_s v_{31s} e^{-\xi_{1s}d} & K_s v_{32s} e^{-\xi_{2s}d} & K_s v_{33s} e^{-\xi_{3s}d} \\ -\xi_{1s} K_s v_{31s} e^{-\xi_{1s}d} & -\xi_{2s} K_s v_{32s} e^{-\xi_{2s}d} & -\xi_{3s} K_s v_{33s} e^{-\xi_{3s}d} \end{pmatrix}, \\
\Lambda_5 &= \begin{pmatrix} V_{41s} e^{\xi_{1s}d} & V_{42s} e^{\xi_{2s}d} & V_{43s} e^{\xi_{3s}d} \\ K_s V_{31s} e^{\xi_{1s}d} & K_s V_{32s} e^{\xi_{2s}d} & K_s V_{33s} e^{\xi_{3s}d} \\ \xi_{1s} K_s V_{31s} e^{\xi_{1s}d} & \xi_{2s} K_s V_{32s} e^{\xi_{2s}d} & \xi_{3s} K_s V_{33s} e^{\xi_{3s}d} \end{pmatrix}, \\
\Lambda_6 &= \begin{pmatrix} -v_{41h} e^{-\xi_{1h}d} & -v_{42h} e^{-\xi_{2h}d} & -v_{43h} e^{-\xi_{3h}d} \\ -K_0 v_{31h} e^{-\xi_{1h}d} & -K_0 v_{32h} e^{-\xi_{2h}d} & -K_0 v_{33h} e^{-\xi_{3h}d} \\ \xi_{1h} K_0 v_{31h} e^{-\xi_{1h}d} & \xi_{2h} K_0 v_{32h} e^{-\xi_{2h}d} & \xi_{3h} K_0 v_{33h} e^{-\xi_{3h}d} \end{pmatrix}, \\
\Lambda_7 &= \begin{pmatrix} v_{51s} & v_{52s} & v_{53s} \\ v_{41s} & v_{42s} & v_{43s} \\ v_{31s} & v_{32s} & v_{33s} \end{pmatrix}, \\
\Lambda_8 &= \begin{pmatrix} V_{51s} & V_{52s} & V_{53s} \\ V_{41s} & V_{42s} & V_{43s} \\ V_{31s} & V_{32s} & V_{33s} \end{pmatrix}, \quad \Lambda_9 = \begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}, \\
\Lambda_{10} &= \begin{pmatrix} u_{11s} e^{-\zeta_{1s}d} & u_{12s} e^{-\zeta_{2s}d} & u_{13s} e^{-\zeta_{3s}d} \\ u_{21s} e^{-\zeta_{1s}d} & u_{22s} e^{-\zeta_{2s}d} & u_{23s} e^{-\zeta_{3s}d} \\ u_{51s} e^{-\zeta_{1s}d} & u_{52s} e^{-\zeta_{2s}d} & u_{53s} e^{-\zeta_{3s}d} \end{pmatrix}, \\
\Lambda_{11} &= \begin{pmatrix} U_{11s} e^{\zeta_{1s}d} & U_{12s} e^{\zeta_{2s}d} & U_{13s} e^{\zeta_{3s}d} \\ U_{21s} e^{\zeta_{1s}d} & U_{22s} e^{\zeta_{2s}d} & U_{23s} e^{\zeta_{3s}d} \\ U_{51s} e^{\zeta_{1s}d} & U_{52s} e^{\zeta_{2s}d} & U_{53s} e^{\zeta_{3s}d} \end{pmatrix},
\end{aligned}$$

$$\begin{aligned}
\Lambda_{12} &= \begin{pmatrix} -u_{11h} e^{-\zeta_{1h}d} & -u_{12h} e^{-\zeta_{2h}d} & -u_{13h} e^{-\zeta_{3h}d} \\ -u_{21h} e^{-\zeta_{1h}d} & -u_{22h} e^{-\zeta_{2h}d} & -u_{23h} e^{-\zeta_{3h}d} \\ -u_{51h} e^{-\zeta_{1h}d} & -u_{52h} e^{-\zeta_{2h}d} & -u_{53h} e^{-\zeta_{3h}d} \end{pmatrix}, \\
\Lambda_{13} &= \begin{pmatrix} u_{41s} e^{-\zeta_{1s}d} & u_{42s} e^{-\zeta_{2s}d} & u_{43s} e^{-\zeta_{3s}d} \\ K_s u_{31s} e^{-\zeta_{1s}d} & K_s u_{32s} e^{-\zeta_{2s}d} & K_s u_{33s} e^{-\zeta_{3s}d} \\ -\zeta_{1s} K_s u_{31s} e^{-\zeta_{1s}d} & -\zeta_{2s} K_s u_{32s} e^{-\zeta_{2s}d} & -\zeta_{3s} K_s u_{33s} e^{-\zeta_{3s}d} \end{pmatrix}, \\
\Lambda_{14} &= \begin{pmatrix} U_{41s} e^{\zeta_{1s}d} & U_{42s} e^{\zeta_{2s}d} & U_{43s} e^{\zeta_{3s}d} \\ K_s U_{31s} e^{\zeta_{1s}d} & K_s U_{32s} e^{\zeta_{2s}d} & K_s U_{33s} e^{\zeta_{3s}d} \\ \zeta_{1s} K_s U_{31s} e^{\zeta_{1s}d} & \zeta_{2s} K_s U_{32s} e^{\zeta_{2s}d} & \zeta_{3s} K_s U_{33s} e^{\zeta_{3s}d} \end{pmatrix}, \\
\Lambda_{15} &= \begin{pmatrix} -u_{41h} e^{-\zeta_{1h}d} & -u_{42h} e^{-\zeta_{2h}d} & -u_{43h} e^{-\zeta_{3h}d} \\ -K_0 u_{31h} e^{-\zeta_{1h}d} & -K_0 u_{32h} e^{-\zeta_{2h}d} & -K_0 u_{33h} e^{-\zeta_{3h}d} \\ \zeta_{1h} K_0 u_{31h} e^{-\zeta_{1h}d} & \zeta_{2h} K_0 u_{32h} e^{-\zeta_{2h}d} & \zeta_{3h} K_0 u_{33h} e^{-\zeta_{3h}d} \end{pmatrix}, \\
\Lambda_{16} &= \begin{pmatrix} u_{51s} & u_{52s} & u_{53s} \\ u_{41s} & u_{42s} & u_{43s} \\ u_{31s} & u_{32s} & u_{33s} \end{pmatrix}, \\
\Lambda_{17} &= \begin{pmatrix} U_{51s} & U_{52s} & U_{53s} \\ U_{41s} & U_{42s} & U_{43s} \\ U_{31s} & U_{32s} & U_{33s} \end{pmatrix}, \quad \Lambda_{18} = \begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix},
\end{aligned}$$

$$\begin{aligned}
g_1 &= - \sum_{i=1}^3 \sum_{j=1}^3 (Q_{1,ij} v_{3is} v_{3js} M_{is} M_{js} e^{-d(\xi_{is} + \xi_{js})} + W_{1,ij} v_{3is} V_{3js} M_{is} m_{js} e^{y(-\xi_{is} + \xi_{js})} \\
&\quad + O_{1,ij} V_{3is} V_{3js} m_{is} m_{js} e^{d(\xi_{is} + \xi_{js})}) + \sum_{i=1}^3 \sum_{j=1}^3 E_{1h,ij} v_{3ih} v_{3jh} M_{ih} M_{jh} e^{-(\xi_{ih} + \xi_{jh})d},
\end{aligned}$$

$$\begin{aligned}
g_2 &= - \sum_{i=1}^3 \sum_{j=1}^3 (Q_{2,ij} v_{3is} v_{3js} M_{is} M_{js} e^{-d(\xi_{is} + \xi_{js})} + W_{2,ij} v_{3is} V_{3js} M_{is} m_{js} e^{d(-\xi_{is} + \xi_{js})} \\
&\quad + O_{2,ij} V_{3is} V_{3js} m_{is} m_{js} e^{d(\xi_{is} + \xi_{js})}) + \sum_{i=1}^3 \sum_{j=1}^3 E_{2h,ij} v_{3ih} v_{3jh} M_{ih} M_{jh} e^{-(\xi_{ih} + \xi_{jh})d},
\end{aligned}$$

$$\begin{aligned}
g_3 &= - \sum_{i=1}^3 \sum_{j=1}^3 (Q_{5,ij} v_{3is} v_{3js} M_{is} M_{js} e^{-d(\xi_{is} + \xi_{js})} + W_{5,ij} v_{3is} V_{3js} M_{is} m_{js} e^{d(-\xi_{is} + \xi_{js})} \\
&\quad + O_{5,ij} V_{3is} V_{3js} m_{is} m_{js} e^{d(\xi_{is} + \xi_{js})}) + \sum_{i=1}^3 \sum_{j=1}^3 E_{5h,ij} v_{3ih} v_{3jh} M_{ih} M_{jh} e^{-(\xi_{ih} + \xi_{jh})d},
\end{aligned}$$

$$\begin{aligned}
g_4 &= - \sum_{i=1}^3 \sum_{j=1}^3 (Q_{4,ij} v_{3is} v_{3js} M_{is} M_{js} e^{-d(\xi_{is} + \xi_{js})} + W_{4,ij} v_{3is} V_{3js} M_{is} m_{js} e^{d(-\xi_{is} + \xi_{js})} \\
&\quad + O_{4,ij} V_{3is} V_{3js} m_{is} m_{js} e^{d(\xi_{is} + \xi_{js})}) + \sum_{i=1}^3 \sum_{j=1}^3 E_{4h,ij} v_{3ih} v_{3jh} M_{ih} M_{jh} e^{-(\xi_{ih} + \xi_{jh})d}, \\
g_5 &= - \sum_{i=1}^3 \sum_{j=1}^3 K_s (Q_{3,ij} v_{3is} v_{3js} M_{is} M_{js} e^{-y(\xi_{is} + \xi_{js})} + W_{3,ij} v_{3is} V_{3js} M_{is} m_{js} e^{d(-\xi_{is} + \xi_{js})} \\
&\quad + O_{3,ij} V_{3is} V_{3js} m_{is} m_{js} e^{d(\xi_{is} + \xi_{js})}) + \sum_{i=1}^3 \sum_{j=1}^3 K_0 E_{3h,ij} v_{3ih} v_{3jh} M_{ih} M_{jh} e^{-(\xi_{ih} + \xi_{jh})d}, \\
g_6 &= - \sum_{i=1}^3 \sum_{j=1}^3 K_s (- (\xi_{is} + \xi_{js}) Q_{3,ij} v_{3is} v_{3js} M_{is} M_{js} e^{-d(\xi_{is} + \xi_{js})} \\
&\quad + (-\xi_{is} + \xi_{js}) W_{3,ij} v_{3is} V_{3js} M_{is} m_{js} e^{d(-\xi_{is} + \xi_{js})} \\
&\quad + (\xi_{is} + \xi_{js}) O_{3,ij} V_{3is} V_{3js} m_{is} m_{js} e^{d(\xi_{is} + \xi_{js})}) \\
&\quad + \sum_{i=1}^3 \sum_{j=1}^3 - (\xi_{ih} + \xi_{jh}) K_0 E_{3h,ij} v_{3ih} v_{3jh} M_{ih} M_{jh} e^{-(\xi_{ih} + \xi_{jh})d}, \\
g_7 &= - \sum_{i=1}^3 \sum_{j=1}^3 (Q_{5,ij} v_{3is} v_{3js} M_{is} M_{js} e^{-d(\xi_{is} + \xi_{js})} \\
&\quad + W_{5,ij} v_{3is} V_{3js} M_{is} m_{js} e^{d(-\xi_{is} + \xi_{js})} + O_{5,ij} V_{3is} V_{3js} m_{is} m_{js} e^{d(\xi_{is} + \xi_{js})}), \\
g_8 &= - \sum_{i=1}^3 \sum_{j=1}^3 (Q_{4,ij} v_{3is} v_{3js} M_{is} M_{js} e^{-d(\xi_{is} + \xi_{js})} \\
&\quad + W_{4,ij} v_{3is} V_{3js} M_{is} m_{js} e^{d(-\xi_{is} + \xi_{js})} + O_{4,ij} V_{3is} V_{3js} m_{is} m_{js} e^{d(\xi_{is} + \xi_{js})}), \\
g_9 &= - \sum_{i=1}^3 \sum_{j=1}^3 (Q_{3,ij} v_{3is} v_{3js} M_{is} M_{js} e^{-y(\xi_{is} + \xi_{js})} \\
&\quad + W_{3,ij} v_{3is} V_{3js} M_{is} m_{js} e^{d(-\xi_{is} + \xi_{js})} + O_{3,ij} V_{3is} V_{3js} m_{is} m_{js} e^{d(\xi_{is} + \xi_{js})}).
\end{aligned}$$