

$$\frac{\mathcal{D}'_3 \left| \begin{array}{c} 0 \\ J_3 \mathcal{D}'_3 J_3 \end{array} \right.}{0} = \frac{\mathcal{D}_3 \left| \begin{array}{c} 0 \\ \tilde{\mathcal{D}}_3 \end{array} \right.}{0} + \frac{\omega_3 \left| \begin{array}{c} 0 \\ \tilde{\omega}_3 \end{array} \right.}{0} - \frac{0 \left| \begin{array}{c} J_3 \\ -\kappa J_3 \end{array} \right.}{0} \frac{\omega_3 \left| \begin{array}{c} 0 \\ \tilde{\omega}_3 \end{array} \right.}{0} - \frac{0 \left| \begin{array}{c} J_3 \\ -\kappa J_3 \end{array} \right.}{0}^{-1} \frac{J_3}{0}$$

$$- \frac{0 \left| \begin{array}{c} J_3 \\ -\kappa J_3 \end{array} \right.}{0} \frac{\omega_3 \left| \begin{array}{c} 0 \\ \tilde{\omega}_3 \end{array} \right.}{0} - \frac{0 \left| \begin{array}{c} J_3 \\ -\kappa J_3 \end{array} \right.}{0}^{-1} \frac{J_3}{0} = \frac{0 \left| \begin{array}{c} J_3 \\ -\kappa J_3 \end{array} \right.}{0} \frac{\omega_3 \left| \begin{array}{c} 0 \\ \tilde{\omega}_3 \end{array} \right.}{0}$$

$$\frac{0 \left| \begin{array}{c} -\kappa J_3 \\ J_3 \end{array} \right.}{J_3} = \frac{J_3 \tilde{\omega}_3 J_3 \left| \begin{array}{c} 0 \\ J_3 \omega_3 J_3 \end{array} \right.}{0} \Rightarrow \mathcal{D}'_3 = \mathcal{D}_3 + \omega_3 + J_3 \tilde{\omega}_3 J_3$$

$$J_3 \mathcal{D}'_3 J_3 = \tilde{\mathcal{D}}_3 + \tilde{\omega}_3 + J_3 \omega_3 J_3$$

$$\frac{0 \left| \begin{array}{c} J_3 \\ -\kappa J_3 \end{array} \right.}{0} \frac{\mathcal{D}'_3 \left| \begin{array}{c} 0 \\ J_3 \mathcal{D}'_3 J_3 \end{array} \right.}{0} + \frac{\mathcal{D}'_3 \left| \begin{array}{c} 0 \\ J_3 \mathcal{D}'_3 J_3 \end{array} \right.}{0} \frac{0 \left| \begin{array}{c} J_3 \\ -\kappa J_3 \end{array} \right.}{0} =$$

$$\frac{0 \left| \begin{array}{c} J_3^2 \mathcal{D}'_3 J_3 + \mathcal{D}'_3 J_3 \\ -\kappa J_3 \mathcal{D}'_3 - \kappa J_3 \mathcal{D}'_3 J_3^2 \end{array} \right.}{0} = \frac{0 \left| \begin{array}{c} 0 \\ 0 \end{array} \right.}{0}$$

$$\mathcal{D}'_3 = \mathbf{h} \mathbf{x} \mathbf{1} + \mathbf{1} \mathbf{x} \mathbf{h}' + \mathbf{\Gamma} \mathbf{x} \mathcal{M}'$$

$$\omega' = \frac{\omega_a \mathbf{x} \left| \begin{array}{c} a \\ 0 \end{array} \right. \frac{0}{0} + \omega \mathbf{x} \left| \begin{array}{c} 2/3 \\ 0 \end{array} \right. \frac{0}{2} \left| \begin{array}{c} 0 \\ 0 \end{array} \right.}{0} \left| \begin{array}{c} 0 \\ \omega_a \mathbf{x} a - \omega \mathbf{x} 4/3 \end{array} \right. \frac{0}{0}$$

$$\frac{0}{0} \left| \begin{array}{c} 0 \\ \Omega \mathbf{x} \left| \begin{array}{c} 1 \\ 0 \end{array} \right. \frac{0}{1} + \omega_a \mathbf{x} \left| \begin{array}{c} a \\ 0 \end{array} \right. \frac{0}{0} - \omega \mathbf{x} \left| \begin{array}{c} 1/3 \\ 0 \end{array} \right. \frac{0}{-1} \end{array} \right.$$

$$\mathcal{M}' = \frac{0 \left| \begin{array}{c} 0 \\ 0 \end{array} \right. \left| \begin{array}{c} 0 \\ 0 \end{array} \right. \left| \begin{array}{c} \kappa(\varphi + \varepsilon)^* \mathbf{x} \left| \begin{array}{c} d^* \\ 0 \end{array} \right. \frac{0}{e^*} \end{array} \right.}{0 \left| \begin{array}{c} 0 \\ 0 \end{array} \right. \left| \begin{array}{c} 0 \\ 0 \end{array} \right. \left| \begin{array}{c} \kappa(\varphi + \varepsilon)^* \mathbf{x} \left[u^* \right] \end{array} \right.}$$

$$\left(\varphi + \varepsilon \right) \mathbf{x} \left| \begin{array}{c} d \\ 0 \end{array} \right. \frac{0}{e} \left| \begin{array}{c} u \\ 0 \end{array} \right. \left| \begin{array}{c} 0 \\ 0 \end{array} \right.$$

$$J_3 \tilde{\omega}_3 J_3 = \frac{\omega_a \mathbf{x} \left| \begin{array}{c} a \\ 0 \end{array} \right. \frac{0}{0} - \omega \mathbf{x} \left| \begin{array}{c} 1/3 \\ 0 \end{array} \right. \frac{0}{-1} \left| \begin{array}{c} 0 \\ 0 \end{array} \right.}{0} \left| \begin{array}{c} 0 \\ \omega_a \mathbf{x} a - \omega \mathbf{x} 1/3 \end{array} \right. \frac{0}{0}$$

$$\frac{0}{0} \left| \begin{array}{c} 0 \\ \omega_a \mathbf{x} \left| \begin{array}{c} a \\ 0 \end{array} \right. \frac{0}{0} - \omega \mathbf{x} \left| \begin{array}{c} 1/3 \\ 0 \end{array} \right. \frac{0}{-1} \end{array} \right.$$

$$J_3 \tilde{\omega}_3 J_3 + \omega_3 = \frac{\omega_a \mathbf{x} \left| \begin{array}{c} a \\ 0 \end{array} \right. \frac{0}{0} + \omega \mathbf{x} \left| \begin{array}{c} 2/3 \\ 0 \end{array} \right. \frac{0}{2} \left| \begin{array}{c} 0 \\ 0 \end{array} \right. \left| \begin{array}{c} 0 \\ \kappa \Gamma \varphi^* \mathbf{x} \left| \begin{array}{c} d^* \\ 0 \end{array} \right. \frac{0}{e^*} \end{array} \right.}{0} \left| \begin{array}{c} 0 \\ \omega_a \mathbf{x} a - \omega \mathbf{x} 4/3 \end{array} \right. \left| \begin{array}{c} 0 \\ \kappa \Gamma \varphi^* \mathbf{x} \left[u^* \right] \end{array} \right.$$

$$\frac{\varphi \Gamma \mathbf{x} \left| \begin{array}{c} d \\ 0 \end{array} \right. \frac{0}{e}}{0} \left| \begin{array}{c} 0 \\ \varphi \Gamma \mathbf{x} \left[u \right] \end{array} \right. \left| \begin{array}{c} 0 \\ \Omega \mathbf{x} \left| \begin{array}{c} 1 \\ 0 \end{array} \right. \frac{0}{1} + \omega_a \mathbf{x} \left| \begin{array}{c} a \\ 0 \end{array} \right. \frac{0}{0} - \omega \mathbf{x} \left| \begin{array}{c} 1/3 \\ 0 \end{array} \right. \frac{0}{-1} \end{array} \right.$$

$$\begin{aligned}
J_3 \omega_3 J_3 + \tilde{\omega}_3 = & \begin{array}{c|c|c} \bar{\omega}_a \mathbf{z} \frac{\bar{a}}{0} \Big| \frac{0}{0} & -\omega \mathbf{z} \frac{2/3}{0} \Big| \frac{0}{2} & 0 \\ \hline 0 & 0 & -\varkappa \Gamma \varphi^t \mathbf{z} \frac{d^t}{0} \Big| \frac{0}{e^t} \\ \hline 0 & \bar{\omega}_a \mathbf{z} \bar{a} + \omega \mathbf{z} 4/3 & -\varkappa \Gamma \varphi^t \mathbf{z} [u^t \ 0] \\ \hline -\bar{\varphi} \Gamma \mathbf{z} \frac{d}{0} \Big| \frac{0}{e} & -\bar{\varphi} \Gamma \mathbf{z} \begin{bmatrix} u \\ 0 \end{bmatrix} & \bar{\Omega} \mathbf{z} \frac{1}{0} \Big| \frac{0}{1} + \bar{\omega}_a \mathbf{z} \frac{\bar{a}}{0} \Big| \frac{0}{0} + \omega \mathbf{z} \frac{1/3}{0} \Big| \frac{0}{-1} \end{array} \\
\mathcal{D}_3 = & \begin{array}{c|c|c} \mathfrak{r} \mathbf{z} \frac{1}{0} \Big| \frac{0}{1} + \\ \omega_a \mathbf{z} \frac{a}{0} \Big| \frac{0}{0} + \\ \omega \mathbf{z} \frac{2/3}{0} \Big| \frac{0}{2} & 0 & \varkappa \Gamma (\varphi + \varepsilon)^* \mathbf{z} \frac{d^*}{0} \Big| \frac{0}{e^*} \\ \hline 0 & \mathfrak{r} \mathbf{z} 1 + \\ \omega_a \mathbf{z} a - \\ \omega \mathbf{z} 4/3 & \varkappa \Gamma (\varphi + \varepsilon)^* \mathbf{z} [u^* \ 0] \\ \hline (\varphi + \varepsilon) \Gamma \mathbf{z} \frac{d}{0} \Big| \frac{0}{e} & (\varphi + \varepsilon) \Gamma \mathbf{z} \begin{bmatrix} u \\ 0 \end{bmatrix} & (\mathfrak{r} + \Omega) \mathbf{z} \frac{1}{0} \Big| \frac{0}{1} + \\ \omega_a \mathbf{z} \frac{a}{0} \Big| \frac{0}{0} - \\ \omega \mathbf{z} \frac{1/3}{0} \Big| \frac{0}{-1} \end{array} \\
J_3 \mathcal{D}_3 J_3 = & \begin{array}{c|c|c} \mathfrak{r} \mathbf{z} \frac{1}{0} \Big| \frac{0}{1} + \\ \bar{\omega}_a \mathbf{z} \frac{\bar{a}}{0} \Big| \frac{0}{0} - \\ \bar{\omega} \mathbf{z} \frac{2/3}{0} \Big| \frac{0}{2} & 0 & -\varkappa \Gamma (\varphi + \varepsilon)^t \mathbf{z} \frac{d^t}{0} \Big| \frac{0}{e^t} \\ \hline 0 & \mathfrak{r} \mathbf{z} 1 + \\ \bar{\omega}_a \mathbf{z} \bar{a} - \\ \bar{\omega} \mathbf{z} 4/3 & -\varkappa \Gamma (\varphi + \varepsilon)^t \mathbf{z} [u^t \ 0] \\ \hline -(\bar{\varphi} + \varepsilon) \Gamma \mathbf{z} \frac{d}{0} \Big| \frac{0}{e} & -(\bar{\varphi} + \varepsilon) \Gamma \mathbf{z} \begin{bmatrix} u \\ 0 \end{bmatrix} & (\mathfrak{r} + \bar{\Omega}) \mathbf{z} \frac{1}{0} \Big| \frac{0}{1} + \\ \bar{\omega}_a \mathbf{z} \frac{\bar{a}}{0} \Big| \frac{0}{0} + \\ \omega \mathbf{z} \frac{1}{3} \Big| \frac{0}{-1} \end{array}
\end{aligned}$$

$$\text{unbekannt} = \begin{array}{c|c|c} \begin{array}{c|c} \bar{\omega}_a \mathbf{x} \frac{\bar{a}}{0} \Big| \frac{0}{0} + \\ \omega \mathbf{x} \frac{1/3}{0} \Big| \frac{0}{-1} \end{array} & & \\ \hline 0 & \begin{array}{c} \bar{\omega}_a \mathbf{x} \bar{a} + \\ \omega \mathbf{x} 1/3 \end{array} & 0 \\ \hline 0 & 0 & \begin{array}{c|c} \bar{\omega}_a \mathbf{x} \frac{\bar{a}}{0} \Big| \frac{0}{0} + \\ \bar{\omega} \mathbf{x} \frac{1/3}{0} \Big| \frac{0}{-1} \end{array} \end{array}$$

$$\frac{\psi_3}{\tilde{\psi}_3} \mathbf{x} \frac{\mathcal{D}'_3}{0} \Big| \frac{0}{J_3 \mathcal{D}'_3 J_3} \frac{\psi_3}{\tilde{\psi}_3} - \frac{\mathcal{D}'_3}{0} \Big| \frac{0}{J_3 \mathcal{D}'_3 J_3}$$

$$\frac{\psi_3}{\tilde{\psi}_3} \mathbf{x} \frac{\psi_3}{\tilde{\psi}_3}$$

$$= \psi_3 \mathbf{x} \mathcal{D}'_3 \psi_3 + \tilde{\psi}_3 \mathbf{x} J_3 \mathcal{D}'_3 J_3 \tilde{\psi}_3 - \mathcal{D}'_3 \psi_3 \mathbf{x} \psi_3 - J_3 \mathcal{D}'_3 J_3 \tilde{\psi}_3 \mathbf{x} \tilde{\psi}_3$$

$$= \psi_3 \mathbf{x} \mathcal{D}'_3 \psi_3 - \mathcal{D}'_3 \psi_3 \mathbf{x} \psi_3 + \tilde{\psi}_3 \mathbf{x} J_3 \mathcal{D}'_3 J_3 \tilde{\psi}_3 - J_3 \mathcal{D}'_3 J_3 \tilde{\psi}_3 \mathbf{x} \tilde{\psi}_3$$

$$\psi_3^{\mathbb{R}} \mathbf{x} \left(\mathcal{D}_3^{\mathbb{R}} + \omega_3^{\mathbb{R}} - J_3^{\mathbb{R}} \omega_3^{\mathbb{R}} \left(J_3^{\mathbb{R}} \right)^{-1} \right) \psi_3^{\mathbb{R}} = \Re \psi_3^{\mathbb{R}} \mathbf{x} \left(\mathcal{D}_3^{\mathbb{R}} + \omega_3^{\mathbb{R}} - J_3^{\mathbb{R}} \omega_3^{\mathbb{R}} \left(J_3^{\mathbb{R}} \right)^{-1} \right) \psi_3^{\mathbb{R}} = 2 \Re \psi_3 \mathbf{x} (\mathcal{D}_3 + \omega_3) \psi_3$$

$$\left[\psi_{d_R} \psi_{e_R} \psi_{u_R} \psi_{d_L} \psi_{e_L} \psi_{u_L} \psi_{\nu_L} \right] \mathbf{x}$$

$$\begin{array}{c|c|c} \begin{array}{c|c} \mathfrak{h} \mathbf{x} \frac{1}{0} \Big| \frac{0}{1} + \\ \omega_a \mathbf{x} \frac{a}{0} \Big| \frac{0}{0} + \\ \omega \mathbf{x} \frac{2/3}{0} \Big| \frac{0}{2} \end{array} & & \\ \hline 0 & \begin{array}{c} \mathfrak{h} \mathbf{x} 1 + \\ \omega_a \mathbf{x} a - \\ \omega \mathbf{x} 4/3 \end{array} & \begin{array}{c} \varkappa \Gamma(\varphi + \varepsilon)^* \mathbf{x} \frac{d^*}{0} \Big| \frac{0}{e^*} \\ \varkappa \Gamma(\varphi + \varepsilon)^* \mathbf{x} [u^* \ 0] \end{array} \\ \hline (\varphi + \varepsilon) \Gamma \mathbf{x} \frac{d}{0} \Big| \frac{0}{e} & (\varphi + \varepsilon) \Gamma \mathbf{x} \begin{bmatrix} u \\ 0 \end{bmatrix} & \begin{array}{c|c} (\mathfrak{h} + \Omega) \mathbf{x} \frac{1}{0} \Big| \frac{0}{1} + \\ \omega_a \mathbf{x} \frac{a}{0} \Big| \frac{0}{0} - \\ \omega \mathbf{x} \frac{1/3}{0} \Big| \frac{0}{-1} \end{array} \end{array}$$

$$\begin{bmatrix} \psi_{d_R} \\ \psi_{e_R} \\ \psi_{u_R} \\ \psi_{d_L} \\ \psi_{e_L} \\ \psi_{u_L} \\ \psi_{\nu_L} \end{bmatrix} =$$

$$\begin{aligned} & \psi_{d_R} \mathfrak{K} \left(\mathfrak{r} \mathfrak{z} \mathbf{1} + \omega_a \mathfrak{z} a + \frac{2}{3} \omega \mathfrak{z} \mathbf{1} \right) \psi_{d_R} + \psi_{e_R} \mathfrak{K} \left(\mathfrak{r} \mathfrak{z} \mathbf{1} + 2\omega \mathfrak{z} \mathbf{1} \right) \psi_{e_R} + \psi_{u_R} \mathfrak{K} \left(\mathfrak{r} \mathfrak{z} \mathbf{1} + \omega_a \mathfrak{z} a - \frac{4}{3} \omega \mathfrak{z} \mathbf{1} \right) \psi_{u_R} \\ & + \frac{\psi_{d_L}}{\psi_{u_L}} \mathfrak{K} \left((\mathfrak{r} + \Omega) \mathfrak{z} \mathbf{1} + \omega_a \mathfrak{z} a - \frac{1}{3} \omega \mathfrak{z} \mathbf{1} \right) \frac{\psi_{d_L}}{\psi_{u_L}} + \frac{\psi_{e_L}}{\psi_{\nu_L}} \mathfrak{K} \left((\mathfrak{r} + \Omega) \mathfrak{z} \mathbf{1} + \omega \mathfrak{z} \mathbf{1} \right) \frac{\psi_{e_L}}{\psi_{\nu_L}} \\ & + \frac{\psi_{d_L}}{\psi_{u_L}} \mathfrak{K} \left((\varphi + \varepsilon) \Gamma \mathfrak{z} d \right) \psi_{d_R} + \frac{\psi_{d_L}}{\psi_{u_L}} \mathfrak{K} \left((\varphi + \varepsilon) \Gamma \mathfrak{z} u \right) \psi_{u_R} + \frac{\psi_{e_L}}{\psi_{\nu_L}} \mathfrak{K} \left((\varphi + \varepsilon) \Gamma \mathfrak{z} e \right) \psi_{e_R} \\ & + \varkappa \psi_{e_R} \mathfrak{K} \left(\Gamma(\varphi + \varepsilon)^* \mathfrak{z} e^* \right) \frac{\psi_{e_L}}{\psi_{\nu_L}} + \varkappa \psi_{d_R} \mathfrak{K} \left(\Gamma(\varphi + \varepsilon)^* \mathfrak{z} d^* \right) \frac{\psi_{d_L}}{\psi_{u_L}} + \varkappa \psi_{u_R} \mathfrak{K} \left(\Gamma(\varphi + \varepsilon)^* \mathfrak{z} u^* \right) \frac{\psi_{d_L}}{\psi_{u_L}} \end{aligned}$$

$$\mathcal{D}' \begin{bmatrix} \psi_d \mathfrak{z} \frac{d_R}{e_R} \\ \psi_u \mathfrak{z} u_R \\ \Psi \mathfrak{z} \frac{q_L}{\ell_L} \end{bmatrix} =$$

$$\left[\begin{array}{c} \mathfrak{r} \psi_d \mathfrak{z} \frac{d_R}{e_R} + \omega_a \psi_d \mathfrak{z} a \mid d_R \ 0 + \omega \psi_d \mathfrak{z} \frac{2}{3} \frac{d_R}{e_R} + \varkappa \Gamma(\varphi + \varepsilon)^* \Psi \mathfrak{z} \frac{d^*}{e^*} \mid \frac{q_L}{\ell_L} \\ \mathfrak{r} \psi_u \mathfrak{z} u_R + \omega_a \psi_u \mathfrak{z} a u_R - \omega \psi_u \mathfrak{z} \frac{4}{3} u_R + \varkappa \Gamma(\varphi + \varepsilon)^* \Psi \mathfrak{z} u^* q_L \\ (\varphi + \varepsilon) \Gamma \psi_d \mathfrak{z} \frac{d}{e} \mid \frac{d_R}{e_R} + (\varphi + \varepsilon) \Gamma \psi_u \mathfrak{z} u \mid u_R \ 0 + (\mathfrak{r} + \Omega) \Psi \mathfrak{z} \frac{q_L}{\ell_L} + \omega_a \Psi \mathfrak{z} a \mid q_L \ 0 - \omega \Psi \mathfrak{z} \frac{1}{3} \mid \frac{q_L}{\ell_L} \end{array} \right]$$

$$\mathfrak{R}i \begin{bmatrix} \psi_d \mathfrak{z} \frac{d_R}{e_R} \\ \psi_u \mathfrak{z} u_R \\ \Psi \mathfrak{z} \frac{q_L}{\ell_L} \end{bmatrix} \mathfrak{K} \mathcal{D}' \begin{bmatrix} \psi_d \mathfrak{z} \frac{d_R}{e_R} \\ \psi_u \mathfrak{z} u_R \\ \Psi \mathfrak{z} \frac{q_L}{\ell_L} \end{bmatrix}$$

$$\begin{aligned}
& \psi_d \bowtie \mathfrak{H} \psi_d \left(d_R^* d_R + e_R^* e_R \right) + \psi_u \bowtie \mathfrak{H} \psi_u u_R^* u_R + \Psi \bowtie (\mathfrak{H} + \Omega) \Psi \left(q_L^* q_L + \ell_L^* \ell_L \right) + \psi_d \bowtie \omega \psi_d \left(\frac{2}{3} d_R^* d_R + 2e_R^* e_R \right) \\
& \quad + \omega \psi_u \bowtie \psi_u \frac{4}{3} u_R^* u_R + \Psi \bowtie \omega \Psi \bowtie \Psi \left(\frac{1}{3} q_L^* q_L - \ell_L^* \ell_L \right) \\
& \quad + \psi_d \bowtie \omega_a \psi_d d_R^* a d_R + \psi_u \bowtie \omega_a \psi_u u_R^* a u_R + \Psi \bowtie \omega_a \Psi q_L^* a q_L \\
& \quad + 2\Re i \Psi \bowtie (\varphi + \varepsilon) \Gamma \psi_d \left(q_L^* d d_R + \ell_L^* e e_R \right) + 2\Re i \Psi \bowtie (\varphi + \varepsilon) \Gamma \psi_u q_L^* u u_R
\end{aligned}$$

$$\begin{aligned}
\text{LHS} &= \Re i \begin{bmatrix} \psi_d \bowtie \frac{d_R}{e_R} \\ \psi_u \bowtie u_R \\ \Psi \bowtie \frac{q_L}{\ell_L} \end{bmatrix} \bowtie \begin{bmatrix} \mathfrak{H} \psi_d \bowtie \frac{d_R}{e_R} + \omega_a \psi_d \bowtie a \mid d_R \ 0 + \omega \psi_d \bowtie \frac{2}{3} \frac{d_R}{e_R} + \varkappa \Gamma (\varphi + \varepsilon)^* \Psi \bowtie \frac{d^*}{e^*} \mid \frac{q_L}{\ell_L} \\ \mathfrak{H} \psi_u \bowtie u_R + \omega_a \psi_u \bowtie a u_R - \omega \psi_u \bowtie \frac{4}{3} u_R + \varkappa \Gamma (\varphi + \varepsilon)^* \Psi \bowtie u^* q_L \\ (\varphi + \varepsilon) \Gamma \psi_d \bowtie \frac{d}{e} \mid \frac{d_R}{e_R} + (\varphi + \varepsilon) \Gamma \psi_u \bowtie u \mid u_R \ 0 + (\mathfrak{H} + \Omega) \Psi \bowtie \frac{q_L}{\ell_L} + \omega_a \Psi \bowtie a \mid q_L \ 0 - \omega \Psi \end{bmatrix} \\
&= \Re i \psi_d \bowtie \mathfrak{H} \psi_d \left(d_R^* d_R + e_R^* e_R \right) + \psi_d \bowtie \omega_a \psi_d d_R^* a d_R + \psi_d \bowtie \omega \psi_d \left(\frac{2}{3} d_R^* d_R + 2e_R^* e_R \right) \\
& \quad + \varkappa \psi_d \bowtie \Gamma (\varphi + \varepsilon)^* \Psi \left(d_R^* d^* q_L + e_R^* e^* \ell_L \right) + \psi_u \bowtie \mathfrak{H} \psi_u u_R^* u_R + \psi_u \bowtie \omega_a \psi_u u_R^* a u_R - \psi_u \bowtie \omega \psi_u \frac{4}{3} u_R^* u_R \\
& \quad + \varkappa \psi_u \bowtie \Gamma (\varphi + \varepsilon)^* \Psi u_R^* u^* q_L + \Psi \bowtie (\varphi + \varepsilon) \Gamma \psi_d \left(q_L^* d d_R + \ell_L^* e e_R \right) + \Psi \bowtie (\varphi + \varepsilon) \Gamma \psi_u q_L^* u u_R + \\
& \quad \Psi \bowtie (\mathfrak{H} + \Omega) \Psi \left(q_L^* q_L + \ell_L^* \ell_L \right) + \Psi \bowtie \omega_a \Psi q_L^* a q_L - \Psi \bowtie \omega \Psi \left(\frac{1}{3} q_L^* q_L - \ell_L^* \ell_L \right) = \text{RHS}
\end{aligned}$$

$$\mathfrak{H}^* = -\mathfrak{H}: \quad \Omega^* = \Omega^* = -\Omega: \quad \omega^* = \bar{\omega} = -\omega: \quad \Gamma^* = -\varkappa \Gamma$$

$$(\omega_a \bowtie a)^* = \omega_a^* \bowtie a^* = \bar{\omega}_a \bowtie a^* = -\omega_a \bowtie a$$