

$$\begin{aligned}
& -k_{10} (\chi_9(t) - \chi_{10}(t)) + k_{10} (\chi_{10}(t) - \chi_{P2}(t)) + \\
& 2 m_0 \left(\cos(\theta(t)) R(t) - \cos(\alpha(t)) \cos(\theta(t) + \psi(t)) \left(\frac{9 L_0}{10} + \eta_6(t) + \eta_7(t) + \eta_8(t) + \eta_9(t) + \eta_{10}(t) \right) \right) \\
& \left(\cos(\theta(t)) R'(t) + \cos(\theta(t) + \psi(t)) \sin(\alpha(t)) \left(\frac{9 L_0}{10} + \eta_6(t) + \eta_7(t) + \eta_8(t) + \eta_9(t) + \eta_{10}(t) \right) \alpha'(t) - \right. \\
& \quad R(t) \sin(\theta(t)) \theta'(t) + \\
& \quad \cos(\alpha(t)) \sin(\theta(t) + \psi(t)) \left(\frac{9 L_0}{10} + \eta_6(t) + \eta_7(t) + \eta_8(t) + \eta_9(t) + \eta_{10}(t) \right) (\theta'(t) + \psi'(t)) - \\
& \quad \left. \cos(\alpha(t)) \cos(\theta(t) + \psi(t)) (\eta_6'(t) + \eta_7'(t) + \eta_8'(t) + \eta_9'(t) + \eta_{10}'(t)) \right) \chi_{10}'(t) + \\
& \left(m_0 \left(\cos(\theta(t)) R(t) - \cos(\alpha(t)) \cos(\theta(t) + \psi(t)) \left(\frac{9 L_0}{10} + \eta_6(t) + \eta_7(t) + \eta_8(t) + \eta_9(t) + \eta_{10}(t) \right) \right) \right)^2 + \\
& i_{zm10} \chi_{10}''(t) = c_{10} (\chi_9'(t) - \chi_{10}'(t)) - c_{10} (\chi_{10}'(t) - \chi_{P2}'(t))
\end{aligned}$$