$$d2theta = \frac{\text{taup}\ (M + \text{mp})}{M\,\text{mp}\,\text{Lc}^2 + \text{Jp}\,\text{mp} + \text{Jp}\,M} \tag{1}$$

$$d2x = -\frac{\text{Lc}\,\text{mp}\ \left(\text{Jp}\,M\,\text{dtheta}^2\ \sin(\text{theta}) - M\,\text{taup}\,\cos(\text{theta}) - \text{mp}\,\text{taup}\,\cos(\text{theta}) + \text{Jp}\,\text{dtheta}^2\,\text{mp}\,\sin(\text{theta}) + \text{Lc}^2\,M\,\text{dtheta}^2\,\text{mp}\,\sin(\text{theta})\right)}{(M + \text{mp})\ \left(M\,\text{mp}\,\text{Lc}^2 + \text{Jp}\,\text{mp} + \text{Jp}\,M\right)} \tag{2}$$

$$d2y = -\frac{-1\,\cos(\text{theta})\ \text{Lc}^3\,M\,\text{dtheta}^2\,\text{mp}^2 + g\,\text{Lc}^2\,M^2\,\text{mp} + g\,\text{Lc}^2\,M\,\text{mp}^2 - 1\,\text{Jp}\,\cos(\text{theta})\ \text{Lc}\,M\,\text{dtheta}^2\,\text{mp} - 1\,\text{taup}\,\sin(\text{theta})\ \text{Lc}\,M\,\text{mp} - 1\,\text{Jp}\,\cos(\text{theta})\ \text{Lc}\,\text{dtheta}^2\,\text{mp}^2 - 1\,\text{taup}\,\sin(\text{theta})\ \text{Lc}\,\text{mp}^2 + \text{Jp}\,g\,M^2 + 2\,\text{Jp}\,g\,M\,\text{mp} + \text{Jp}\,g\,\text{mp}^2}{(M + \text{mp})\ \left(M\,\text{mp}\,\text{Lc}^2 + \text{Jp}\,\text{mp} + \text{Jp}\,M\right)} \tag{3}$$