

$$\begin{aligned}
-\frac{\partial H}{\partial \mathbf{x}_a} = \dot{\mathbf{p}}_a = e_a \sum_{b \neq a} \frac{e_b \hat{\mathbf{n}}_{ab}}{R_{ab}^2} \left[ 1 - \left( \frac{1}{2m_a m_b c^2} \right) (\mathbf{p}_a \cdot \mathbf{p}_b) \right] - e_a \sum_{b \neq a} \frac{3e_b \hat{\mathbf{n}}_{ab}}{2m_a m_b c^2 R_{ab}^2} (\mathbf{p}_a \cdot \hat{\mathbf{n}}_{ab}) (\mathbf{p}_b \cdot \hat{\mathbf{n}}_{ab}) + \\
e_a \sum_{b \neq a} \frac{e_b}{2m_a m_b c^2 R_{ab}^2} [\mathbf{p}_a (\mathbf{p}_b \cdot \hat{\mathbf{n}}_{ab}) + \mathbf{p}_b (\mathbf{p}_a \cdot \hat{\mathbf{n}}_{ab})] + \left( \frac{1}{m_a c} \right) \frac{(\mathbf{p}_a \times \mathbf{m})}{x_a^3} - \left( \frac{3}{m_a c} \right) [\mathbf{p}_a \cdot (\mathbf{m} \times \mathbf{x}_a)] \frac{\mathbf{x}_a}{x_a^5} - \\
\left( \frac{2e_a^2}{c^2} \right) \frac{[m^2 \mathbf{x}_a - \mathbf{m} (\mathbf{m} \cdot \mathbf{x}_a)]}{x_a^6} + \left( \frac{6e_a^2}{c^2} \right) [m^2 x_a^2 - (\mathbf{m} \cdot \mathbf{x}_a)^2] \frac{\mathbf{x}_a}{x_a^8}
\end{aligned}$$