

$\Pi_{2ij}(\mathbf{x}_a, \mathbf{p}_a)$ in $H_{3.5\text{PN}}^{\text{int}}(\mathbf{x}_a, \mathbf{p}_a, t)$

$$\begin{aligned}
 \Pi_{2ij}(\mathbf{x}_a, \mathbf{p}_a) := & \frac{1}{5} \left(\frac{1}{16\pi} \right)^2 \sum_a \sum_{b \neq a} \frac{m_b}{m_a r_{ab}} \left\{ \left[5(\mathbf{n}_{ab} \cdot \mathbf{p}_a)^2 - \mathbf{p}_a^2 \right] \delta_{ij} - 2p_{ai} p_{aj} \right. \\
 & + \left. \left[5\mathbf{p}_a^2 - 3(\mathbf{n}_{ab} \cdot \mathbf{p}_a)^2 \right] n_{ab}^i n_{ab}^j - 6(\mathbf{n}_{ab} \cdot \mathbf{p}_a) (n_{ab}^i p_{aj} + n_{ab}^j p_{ai}) \right\} \\
 & + \frac{6}{5} \left(\frac{1}{16\pi} \right)^3 \sum_a \sum_{b \neq a} \frac{m_a^2 m_b}{r_{ab}^2} \left(3n_{ab}^i n_{ab}^j - \delta_{ij} \right) \\
 & + \frac{1}{10} \left(\frac{1}{16\pi} \right)^3 \sum_a \sum_{b \neq a} \sum_{c \neq a, b} m_a m_b m_c \left\{ \left[5 \frac{r_{ca}}{r_{ab}^3} \left(1 - \frac{r_{ca}}{r_{bc}} \right) + \frac{13}{r_{ab} r_{ca}} - \frac{40}{r_{ab} s_{abc}} \right] \delta_{ij} \right. \\
 & + \left. \left[3 \frac{r_{ab}}{r_{ca}^3} + \frac{r_{bc}^2}{r_{ab} r_{ca}^3} - \frac{5}{r_{ab} r_{ca}} + \frac{40}{s_{abc}} \left(\frac{1}{r_{ab}} + \frac{1}{s_{abc}} \right) \right] n_{ab}^i n_{ab}^j \right. \\
 & + \left. \left[2 \frac{(r_{ab} + r_{ca})}{r_{bc}^3} - 16 \left(\frac{1}{r_{ab}^2} + \frac{1}{r_{ca}^2} \right) + \frac{88}{s_{abc}^2} \right] n_{ab}^i n_{ca}^j \right\},
 \end{aligned}$$

with $s_{abc} := r_{ab} + r_{bc} + r_{ca}$,