

$$\begin{aligned}
p_1 \wedge p_2 &= -k^2(q_2 - q_1) \wedge (q_3 - q_1) \\
&= -\frac{K}{MI}m_1m_2m_3(q_1 \wedge q_2 + q_2 \wedge q_3 + q_3 \wedge q_1) \\
&= -\frac{K}{I}m_1m_2q_1 \wedge q_2.
\end{aligned}$$