

$$\begin{aligned}
p_1 \wedge p_2 &= -k^2 (q_2 - q_1) \wedge (q_3 - q_1) \\
&= -\frac{K}{MI} m_1 m_2 m_3 (q_1 \wedge q_2 + q_2 \wedge q_3 + q_3 \wedge q_1) \\
&= -\frac{K}{I} m_1 m_2 q_1 \wedge q_2.
\end{aligned}$$