$m_{b1}(\frac{1}{2} * l_1 * \varpi_1 * \cos\theta_1)^2 = \frac{1}{4} m_{b1} l_1^2 \varpi_1^2 \cos^2\theta_1$

$m_{b1}(\frac{1}{2} * l_1 * \varpi_1 * \sin\theta_1)^2 = \frac{1}{4} m_{b1} l_1^2 \varpi_1^2 \sin^2\theta_1$

$\frac{1}{4} m_{b1} l_1^2 \varpi_1^2 \cos^2\theta_1 + \frac{1}{4} m_{b1} l_1^2 \varpi_1^2 \sin^2\theta_1 = \frac{1}{4} m_{b1} l_1^2 \varpi_1^2$

$m_{b2}(l_1 * \varpi_1 * \cos\theta_1 + \frac{1}{2} l_2 \varpi_2 \cos\theta_2)^2 = \frac{1}{4} m_{b2} \left(2 l_1 \varpi_1 \cos\theta_1 + l_2 \varpi_2 \cos\theta_2\right)^2$

$m_{b2}(l_1 * \varpi_1 * \sin\theta_1 + \frac{1}{2} l_2 \varpi_2 \sin\theta_2)^2 = \frac{1}{4} m_{b2} \left(2 l_1 \varpi_1 \sin\theta_1 + l_2 \varpi_2 \sin\theta_2\right)^2$

$\frac{1}{4} m_{b2} \left(2 l_1 \varpi_1 \cos\theta_1 + l_2 \varpi_2 \cos\theta_2\right)^2 + \frac{1}{4} m_{b2} \left(2 l_1 \varpi_1 \sin\theta_1 + l_2 \varpi_2 \sin\theta_2\right)^2 = \frac{1}{4} m_{b2} \left(4 l_1^2 \varpi_1^2 + 4 \cos\left(\theta_1 - \theta_2\right) l_1 l_2 \varpi$

$m_{m1}(l_1 * \varpi_1 * \cos\theta_1)^2 = m_{m1} l_1^2 \varpi_1^2 \cos^2\theta_1$

$m_{m1}(l_1 * \varpi_1 * \sin\theta_1)^2 = m_{m1} l_1^2 \varpi_1^2 \sin^2\theta_1$

$m_{m1} l_1^2 \varpi_1^2 \cos^2\theta_1 + m_{m1} l_1^2 \varpi_1^2 \sin^2\theta_1 = m_{m1} l_1^2 \varpi_1^2$

$m_{m2}(l_1 * \varpi_1 * \cos\theta_1 + l_2 \varpi_2 \cos\theta_2)^2 = m_{m2} \left(l_1 \varpi_1 \cos\theta_1 + l_2 \varpi_2 \cos\theta_2\right)^2$

$m_{m2}(l_1 * \varpi_1 * \sin\theta_1 + l_2 \varpi_2 \sin\theta_2)^2 = m_{m2} \left(l_1 \varpi_1 \sin\theta_1 + l_2 \varpi_2 \sin\theta_2\right)^2$

$m_{m2} \left(l_1 \varpi_1 \cos\theta_1 + l_2 \varpi_2 \cos\theta_2\right)^2 + m_{m2} \left(l_1 \varpi_1 \sin\theta_1 + l_2 \varpi_2 \sin\theta_2\right)^2 = m_{m2} \left(l_1^2 \varpi_1^2 + 2 \cos\left(\theta_1 - \theta_2\right) l_1 l_2 \varpi_1 \varpi_2 +$

$\frac{1}{12} m_{b1} l_1^2 \varpi_1^2 + \frac{1}{12} m_{b2} l_2^2 \varpi_2^2$

$m_{b1}(-\frac{1}{2} * l_1 * \cos\theta_1)^1 = -\frac{1}{2} m_{b1} l_1 \cos\theta_1$

$m_{b2}(-l_1 * \cos\theta_1 - \frac{1}{2} l_2 \cos\theta_2)^1 = -m_{b2} \left(l_1 \cos\theta_1 + \frac{1}{2} l_2 \cos\theta_2\right)$

$m_{m1}(-l_1 * \cos\theta_1)^1 = -m_{m1} l_1 \cos\theta_1$

$m_{m2}(-l_1 * \cos\theta_1 - l_2 \cos\theta_2)^1 = -m_{m2} \left(l_1 \cos\theta_1 + l_2 \cos\theta_2\right)$

$\frac{1}{2}(\frac{1}{4} m_{b1} l_1^2 \varpi_1^2 + \frac{1}{4} m_{b2} \left(4 l_1^2 \varpi_1^2 + 4 \cos\left(\theta_1 - \theta_2\right) l_1 l_2 \varpi_1 \varpi_2 + l_2^2 \varpi_2^2\right) + \frac{1}{12} m_{b1} l_1^2 \varpi_1^2 +$
$\frac{1}{12} m_{b2} l_2^2 \varpi_2^2 + m_{m1} l_1^2 \varpi_1^2 + m_{m2} \left(l_1^2 \varpi_1^2 + 2 \cos\left(\theta_1 - \theta_2\right) l_1 l_2 \varpi_1 \varpi_2 + l_2^2 \varpi_2^2\right)) - g(-\frac{1}{2} m_{b1} l_1 \cos\theta_1 -$
$m_{b2} \left(l_1 \cos\theta_1 + \frac{1}{2} l_2 \cos\theta_2\right) - m_{m1} l_1 \cos\theta_1 - m_{m2} \left(l_1 \cos\theta_1 + l_2 \cos\theta_2\right)) = \frac{1}{6} m_{b1} l_1^2 \varpi_1^2 +$
$\frac{1}{2} m_{m1} l_1^2 \varpi_1^2 + \frac{1}{2} m_{m2} l_1^2 \varpi_1^2 + \frac{1}{2} m_{m2} l_2^2 \varpi_2^2 + \frac{1}{2} l_1^2 \varpi_1^2 m_{b2} + \frac{1}{6} l_2^2 m_{b2} \varpi_2^2 + \frac{1}{2} g m_{b1} l_1 \cos\theta_1 +$
$g m_{m1} l_1 \cos\theta_1 + g m_{m2} l_1 \cos\theta_1 + g m_{m2} l_2 \cos\theta_2 + g l_1 m_{b2} \cos\theta_1 + \frac{1}{2} g l_2 m_{b2} \cos\theta_2 +$
$m_{m2} l_1 l_2 \varpi_1 \varpi_2 \cos\left(\theta_1 - \theta_2\right) + \frac{1}{2} l_1 l_2 \varpi_1 m_{b2} \varpi_2 \cos\left(\theta_1 - \theta_2\right)$