

$$m \frac{d^2}{dt^2} x_A = mg + k(x_B - x_A - L) \quad (1)$$

$$m \frac{d^2}{dt^2} x_B = mg - k(x_B - x_A - L) \quad (2)$$

$$(1) \text{ の両辺に } \frac{d^2}{dt^2} \text{ をかける} \quad (3)$$

$$m \frac{d^4}{dt^4} x_A = k \left(\frac{d^2}{dt^2} x_B - \frac{d^2}{dt^2} x_A \right) \quad (4)$$

$$(1)(2) \text{ を代入すると} \quad (5)$$

$$m \frac{d^4}{dt^4} x_A = k(-2k(L - x_A + x_B)) \quad (6)$$

$$m \frac{d^4}{dt^4} x_A = -2k^2(L - x_A + x_B) \quad (7)$$

$$m \frac{d^4}{dt^4} x_A = -2k \left(m \frac{d^2}{dt^2} x_A - mg \right) \quad (8)$$

$$\frac{d^4}{dt^4} x_A = -2k \frac{d^2}{dt^2} x_A + 2kg \quad (9)$$

(10)