Yay Tipi:Sertlesen Yay

$$k \, \text{Log}[1 + x[t]]$$

Sistemin Toplam Kinetik Enerjisi:

$$\frac{1}{2} \sum_{i=2}^{n} m_i \, (x_i)'[t]^2 + \frac{1}{2} M_N \, (x_N)'[t]^2$$

Sistemin Toplam Potansiyel Enerjisi:

$$\sum_{i=2}^{n} k_i \, (-x_i[t] + \text{Log}[1 + x_i[t] - x_N[t]] \, (1 + x_i[t] - x_N[t]) + x_N[t]) +$$
$$K_N \, (-x_N[t] + \text{Log}[1 + x_N[t]] \, (1 + x_N[t]))$$

Lagrange E■itli■i:

$$-\sum_{i=2}^{n} k_i \, (-x_i[t] + \text{Log}[1 + x_i[t] - x_N[t]] \, (1 + x_i[t] - x_N[t]) + x_N[t]) +$$
$$\frac{1}{2} \sum_{i=2}^{n} m_i \, (x_i)'[t]^2 - K_N \, (-x_N[t] + \text{Log}[1 + x_N[t]] \, (1 + x_N[t])) + \frac{1}{2} M_N \, (x_N)'[t]^2$$

Hareketin Diferansiyel Deklemlerinin Euler Lagrange Denklemlerinden Cikarilmasi:

$$\frac{\partial L}{\partial x_i(t)} - \frac{\partial}{\partial t} \frac{\partial L}{\partial \frac{\partial x_i(t)}{\partial t}} = 0 \qquad \frac{\partial L}{\partial x_N(t)} - \frac{\partial}{\partial t} \frac{\partial L}{\partial \frac{\partial x_N(t)}{\partial t}} = 0$$

$$-\sum_{i=2}^{n} \text{Log}[1 + x_i[t] - x_N[t]] \, k_i - \frac{1}{2} \sum_{i=2}^{n} 2 \, m_i \, (x_i)''[t] == 0$$

$$-\text{Log}[1 + x_N[t]] \, K_N - \sum_{i=2}^{n} -\text{Log}[1 + x_i[t] - x_N[t]] \, k_i - M_N \, (x_N)''[t] == 0$$

Sistemin Lineerize Edilmis Hali:

Kinetik En:

$$\frac{1}{2} \sum_{i=2}^{n} m_i \, (x_i)'[t]^2 + \frac{1}{2} M_N \, (x_N)'[t]^2$$

Pot En:

$$\sum_{i=2}^{n} \left(0.0721318 \, k_i \, (x_i[t] - x_N[t]) + 0.333333 \, k_i \, (x_i[t] - x_N[t])^2\right) +$$
$$0.0721318 \, K_N \, x_N[t] + 0.333333 \, K_N \, x_N[t]^2$$

Lagrange Eq:

$$-\sum_{i=2}^{n} \left(0.0721318 \, k_i \, (x_i[t] - x_N[t]) + 0.333333 \, k_i \, (x_i[t] - x_N[t])^2\right) +$$
$$\frac{1}{2} \sum_{i=2}^{n} m_i \, (x_i)'[t]^2 - 0.0721318 \, K_N \, x_N[t] - 0.333333 \, K_N \, x_N[t]^2 + \frac{1}{2} M_N \, (x_N)'[t]^2$$

$$-\sum_{i=2}^{n} (0.0721318 \, k_i + 0.666667 \, k_i \, (x_i[t] - x_N[t])) - \frac{1}{2} \sum_{i=2}^{n} 2 \, m_i \, (x_i)''[t] == 0$$

$$-0.0721318 \, K_N -$$
$$\sum_{i=2}^{n} (-0.0721318 \, k_i - 0.666667 \, k_i \, (x_i[t] - x_N[t])) - 0.666667 \, K_N \, x_N[t] - M_N \, (x_N)''[t] == 0$$

{Spring Force vs Displacement F=, $\log(x(t) + 1)$, F_{lin}=, $0.666667 \, (x(t) - 0.5) + 0.405465$}