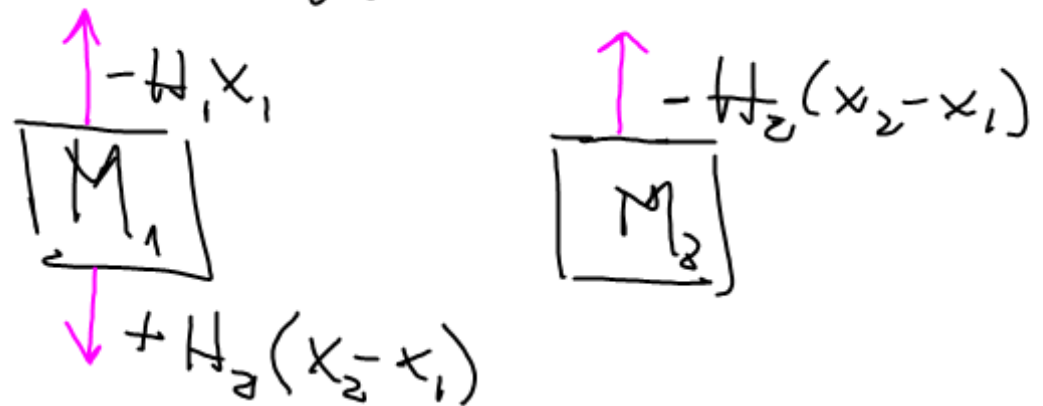


$$M_1 \frac{d^2 x_1}{dt^2} = \sum F_1$$

$$M_2 \frac{d^2 x_2}{dt^2} = \sum M F_2$$



$$M_1 \frac{d^2 x_1}{dt^2} = -H_1 x_1 + H_2 (x_2 - x_1)$$

$$M_2 \frac{d^2 x_2}{dt^2} = -H_2 (x_2 - x_1)$$

$$\frac{d^2 x_1}{dt^2} = \left( -\frac{H_1}{M_1} - \frac{H_2}{M_1} \right) x_1 + \left( \frac{H_2}{M_1} \right) x_2$$

$$\frac{d^2 x_2}{dt^2} = \left( \frac{H_2}{M_2} \right) x_1 + \left( -\frac{H_2}{M_2} \right) x_2$$

$$\frac{dx_1}{dt} = x_3 \quad \frac{dx_2}{dt} = x_4$$

$$\frac{dx_1}{dt} = x_3$$

$$\frac{dx_2}{dt} = x_4$$

$$\frac{dx_3}{dt} = -\left( \frac{H_1 + H_2}{M_1} \right) x_1 + \left( \frac{H_2}{M_1} \right) x_2$$

$$\frac{dx_4}{dt} = \left( \frac{H_2}{M_2} \right) x_1 - \left( \frac{H_2}{M_2} \right) x_2$$

$$\frac{d}{dt} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ -\left( \frac{H_1 + H_2}{M_1} \right) & \frac{H_2}{M_1} & 0 & 0 \\ \frac{H_2}{M_2} & -\frac{H_2}{M_2} & 0 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix}$$

# Presa-Depredador

Conejo      zorros

$z(t)$

$c(t)$

$$\frac{dz}{dt} = -a_{11}z + a_{12}z(t)c(t)$$

$$\frac{dc}{dt} = a_{21}c - a_{22}z(t)c(t)$$


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$$\frac{d^2 y}{dt^2} - 6 \frac{dy}{dt} + 8y = 4e^{2t}$$

$$\begin{cases} y(0) = 1 \\ y'(0) = -1 \end{cases}$$

$$\frac{d^2 y}{dt^2} = 6 \frac{dy}{dt} - 8y + 4e^{2t}$$

$$M_1 = 1$$

$$M_2 = 3$$

$$H_1 = 2$$

$$H_2 = 1$$

