



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

$$H_1 \neq H_2$$

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

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

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

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

$$x_1(0) = \frac{H_2}{H_1} a$$

$$x_2(0) = a$$

$$\left. \frac{dx_1}{dt} \right|_{t=0} = \left. \frac{dx_2}{dt} \right|_{t=0} = 0$$

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

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

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

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

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

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

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

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

$$x_1(0) = \frac{H_2}{H_1} a$$

$$x_2(0) = a$$

$$x_3(0) = 0$$

$$x_4(0) = 0$$

S(4) EDO(1) LCC H.

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

$$\bar{x}(0) = \begin{bmatrix} \frac{H_2}{H_1} a \\ a \\ 0 \\ 0 \end{bmatrix}$$