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DADAS AS EQUAÇÕES:

$$\begin{cases} x = (M_1 x_1 + M_2 x_2)/M \\ \ddot{x} = (M_1 + M_2)/M \end{cases} \Rightarrow \begin{cases} \delta = x_1 - x_2 \\ \ddot{\delta} = -\frac{KM}{M_1 M_2}\delta + \frac{M_1}{M_1} - \frac{M_2}{M_2} \end{cases}$$

$$\Rightarrow X = [x \ \delta \ \dot{x} \ \dot{\delta}]^T \Rightarrow \dot{X} = [\dot{x} \ \dot{\delta} \ \ddot{x} \ \ddot{\delta}]^T$$

$$\Rightarrow \begin{bmatrix} \dot{x} \\ \dot{\delta} \\ \ddot{x} \\ \ddot{\delta} \end{bmatrix} = \begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \\ 0 & -\frac{KM}{M_1 M_2} & 0 & 0 \end{bmatrix} \cdot \begin{bmatrix} x \\ \delta \\ \dot{x} \\ \dot{\delta} \end{bmatrix} + \begin{bmatrix} 0 & 0 \\ 0 & 0 \\ \frac{1}{M} & \frac{1}{M} \\ \frac{1}{M_1} & -\frac{1}{M_2} \end{bmatrix} \cdot \begin{bmatrix} M_1 \\ M_2 \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} y_1 \\ y_2 \end{bmatrix} = \begin{bmatrix} 1 & \frac{M_2}{M} & 0 & 0 \\ 1 & -\frac{M_1}{M} & 0 & 0 \end{bmatrix} \cdot \begin{bmatrix} x \\ \delta \\ \dot{x} \\ \dot{\delta} \end{bmatrix}$$