

$$\ddot{y}(t)+5\cdot\sin\big(y(t)\big)=0 \quad y(0)=y_0 \quad \dot{y}(0)=y_1$$

$$x=\begin{pmatrix}x_1\\x_2\end{pmatrix}=\begin{pmatrix}y(t)\\\dot{y}(t)\end{pmatrix}$$

$$\dot{x}=\begin{pmatrix}\dot{x}_1\\\dot{x}_2\end{pmatrix}=\begin{pmatrix}\dot{y}(t)\\\ddot{y}(t)\end{pmatrix}=\begin{pmatrix}x_2(t)\\-5\cdot\sin\big(x_1(t)\big)\end{pmatrix}$$