8.1.6.

$$\frac{dx}{dt} = -3x + 4y + e^{-t}\sin 2t$$

$$\frac{dy}{dt} = 5x + 9y + 4e^{-t}\cos 2t$$

$$\frac{dz}{dt} = y + 6z - e^{-t}$$

$$\begin{array}{ccc} x \\ y \\ z \end{array} = \frac{d}{dt} \begin{array}{c} x \\ y \\ z \end{array} = \begin{array}{ccc} -3 & 4 & 0 \\ 5 & 9 & 0 \\ 0 & 1 & 6 \end{array} \begin{array}{c} x \\ y \\ z \end{array} + \begin{array}{c} e^{-t}\sin 2t \\ 4e^{-t}\cos 2t \\ -e^{-t} \end{array}$$