

$$\begin{cases} x = -c_1 + 2c_2 e^{3t} + c_3 e^{-3t} \\ y = c_1 + 5c_2 e^{3t} + c_3 e^{-3t} \\ z = c_1 + 2c_2 e^{3t} - 2c_3 e^{-3t} \end{cases}$$

$$\begin{cases} x(0) = -c_1 + 2c_2 + c_3 = -1 \\ y(0) = c_1 + 5c_2 + c_3 = 6 \\ z(0) = c_1 + 2c_2 - 2c_3 = 6 \end{cases}$$

$$\begin{cases} -c_1 + 2c_2 + c_3 = -1 \\ c_1 + 5c_2 + c_3 = 6 \end{cases}$$

$$(+)\quad 7c_2 + 2c_3 = 5$$

$$\begin{cases} c_1 + 2c_2 + c_3 = -1 \\ c_1 + 2c_2 - 2c_3 = 6 \end{cases}$$

$$(+)\quad 4c_2 - c_3 = 5$$

$$\begin{cases} 7c_2 + 2c_3 = 5 \\ 4c_2 - c_3 = 5/2 \end{cases} \Leftrightarrow \begin{cases} 7c_2 + 2c_3 = 5 \\ 8c_2 - 2c_3 = 10 \end{cases}$$

$$\underline{15c_2 = 15}$$

$$\boxed{c_2 = 1}$$

$$4 \cdot 1 - c_3 = 5 \Rightarrow \boxed{c_3 = -1}$$

$$c_1 + 2 - 2(-1) = 6 \Rightarrow c_1 + 4 = 6 \Rightarrow \boxed{c_1 = 2}$$

$$\begin{cases} x_{pc} = -2 + 2 \cdot 1 e^{3t} + (-1) e^{-3t} \\ y_{pc} = 2 + 5 \cdot 1 e^{3t} + (-1) e^{-3t} \\ z_{pc} = 2 + 2 \cdot 1 e^{3t} - 2(-1) e^{-3t} \end{cases} \Rightarrow \begin{cases} x_{pc} = -2 + 2e^{3t} - e^{-3t} \\ y_{pc} = 2 + 5e^{3t} - e^{-3t} \\ z_{pc} = 2 + 2e^{3t} + 2e^{-3t} \end{cases}$$