$$\frac{dT_1}{dt} = T_1' = -C(T_1 - T_2)$$

$$\frac{dT_2}{dt} = T_2 = C(T_1 - T_2)$$

$T_1(0) = 400\,K$

$T_2(0) = 200K$

$$A = \begin{pmatrix} -C & C \\ C & -C \end{pmatrix}$$

$$P(\lambda) = \det(A - \lambda I)$$

$$P(\lambda) = \det\begin{pmatrix} -C-\lambda & C \\ C & -C-\lambda \end{pmatrix}$$

$$P(\lambda) = (-C-\lambda)^2 - C^2$$

$$= C^2 + 2C\lambda + \lambda^2 - C^2 = 0$$

$$\lambda^2 + 2C\lambda = 0$$

$\lambda = 0$

$\lambda = -2C$

Para $\lambda = 0$ $\begin{bmatrix} -C & C \\ C & -C \end{bmatrix}\begin{bmatrix} v_{11} \\ v_{12} \end{bmatrix} = 0$

$$-cV_{11} + cV_{12} = 0$$
$$cV_{11} - cV_{12} = 0$$

$$-V_{11} + V_{12} = 0$$

$$\boxed{V_{11} = V_{12}} \qquad \vec{V}_1 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$

para $\lambda = -2c$

$$\begin{bmatrix} -c & c \\ c & -c \end{bmatrix} \begin{bmatrix} V_{21} \\ V_{22} \end{bmatrix} = 0$$

$$cV_{21} + cV_{22} = 0$$

$$V_{21} = -V_{22} \qquad \vec{V}_2 = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$$

$$\begin{pmatrix} T_1 \\ T_2 \end{pmatrix} = C_1 \begin{pmatrix} 1 \\ 1 \end{pmatrix} e^{0t} + C_2 \begin{pmatrix} 1 \\ -1 \end{pmatrix} e^{-2ct}$$

1

$$T_1 = C_1 + C_2 e^{-2ct}$$

$$T_2 = C_1 - C_2 e^{-2ct}$$

$C_1 = 300$ ✓

- $T_1 = 300 + 100e^{-2ct}$
- $T_2 = 300 - 100e^{-2ct}$

- $T_1(0) = 400 = C_1 + C_2$

$400 - C_2 = C_1$

- $T_2(0) = 200 = C_1 - C_2$

$200 = 400 - C_2 - C_2$

$-200 = -2C_2$

$100 = C_2$ ✓