

$$1) \frac{dA(t)}{dt} = \begin{pmatrix} 2 & 3 \\ 1 & 0 \end{pmatrix} A(t)$$

a) f - a eigenvalue, eigenvector:

$$\lambda_1 = -1 \quad v_1 = \begin{pmatrix} \frac{1}{2} \\ -\frac{1}{4} \end{pmatrix} \quad v_2 = \begin{pmatrix} \frac{3}{4} \\ \frac{1}{2} \end{pmatrix}$$

$$\lambda_2 = 3$$

$$b) \text{ solve } Q \cdot \begin{bmatrix} c_1 \\ c_2 \end{bmatrix} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$$

$$\Rightarrow c_1 = -5, c_2 = 3$$