Handout 5 - Extra homework 4
Fri. Jun. 12, 2009

In each of the following exercises, the coefficient matrix of a linear system of equations is given. Find the general solution to the system from knowledge of the exponential of the coefficient matrix.

Exercise 1.

$$A = \begin{pmatrix} 0 & 1 \\ 6 & 1 \end{pmatrix}; \quad e^{At} = \frac{1}{5}\begin{pmatrix} 3e^{-2t} + 2e^{3t} & -e^{-2t} + e^{3t} \\ -6e^{-2t} + 6e^{3t} & 2e^{-2t} + 3e^{3t} \end{pmatrix}$$

Exercise 2.

$$B = \begin{pmatrix} 0 & 11 \\ 0 & 0 \end{pmatrix}; \quad e^{Bt} = \begin{pmatrix} 1 & 11t \\ 0 & 1 \end{pmatrix}$$

Exercise 3.

$$C = \begin{pmatrix} 0 & 8 \\ -8 & 0 \end{pmatrix}; \quad e^{Ct} = \begin{pmatrix} \cos 8t & \sin 8t \\ -\sin 8t & \cos 8t \end{pmatrix}$$