

## AM 34, HW 4, Due Friday 13, Oct 06

In this HW you will use Laplace transforms to solve systems of equations. To brush up on Laplace transforms look at §6.2 in the book.

Problem 1. Consider the matrix

$$A = \begin{pmatrix} 0 & 1 \\ -4 & 0 \end{pmatrix}.$$

- a) Compute the transfer matrix  $(sI - A)^{-1}$ .
- b) In class it was stated that the fundamental matrix  $e^{tA}$  is the the inverse Laplace transform of the transfer matrix. Apply this method to determine  $e^{tA}$  by finding the inverse Laplace transform of the matrix you found in step (a).

Problem 2. Repeat steps (a) and (b) for the following matrix:

$$A = \begin{pmatrix} 0 & 1 \\ -4 & -1 \end{pmatrix}.$$

Also do problems 3 and 7 in §7.9 by the method of Laplace transforms outlined on p.437-438. Do **not** compute eigenvalues and eigenvectors as in the previous HW.