

MATH 489, Section C14, HW 2. Due date: 02/13/09.

Problem 1

Find the general solution of the system

$$X' = \begin{pmatrix} a & b \\ c & a \end{pmatrix} X,$$

where  $bc > 0$ .

Problem 2

Find all values of both  $c$  and  $k$  for which

$$x'' + cx' + kx = 0$$

has real, distinct eigenvalues. Find the general solution. Use this to describe the motion of the mass when the initial condition is  $(0, 1)$ .

Problem 3

Assume that the mass-spring-dashpot system of the previous problem is a model for car suspensions, with  $x$  denoting the vertical motion of the car. How comfortable would it be to ride in this car? Justify your answer.