

MATH 489, Section C14, HW 3. Due date: 02/20/09.

Problem 1

(a) Find all  $2 \times 2$  matrices that have pure imaginary eigenvalues. That is, determine conditions on the entries of a matrix that guarantee that the matrix has pure imaginary eigenvalues.

(b) Determine conditions that guarantees that a  $A$  has complex eigenvalues.

Problem 2

Show that in solving the eigenvector problem

$$(A - \lambda I)V = \begin{pmatrix} a - \lambda & b \\ c & d - \lambda \end{pmatrix} V = 0,$$

the second row equation is redundant.