

Problem Set 2

ECON5153

For full credit you must show all your work.

1. Use Gauss-Jordan elimination method to invert matrix A , and use adjoint matrix method to invert matrix B below.

$$A = \begin{pmatrix} 0 & 3 & 2 \\ -1 & 5 & 4 \\ 1 & -2 & 2 \end{pmatrix}; \quad B = \begin{pmatrix} -2 & 3 & 0 \\ 1 & 3 & 5 \\ -2 & 4 & 1 \end{pmatrix}.$$

2. Exercise 8.27 on Simon and Blume page 173.

3. (1) For all values of x determine the rank of $A = \begin{pmatrix} 5-x & 2 & 1 \\ 2 & 1-x & 0 \\ 1 & 0 & 1-x \end{pmatrix}$;

(2) Show that the equations

$$x + 3y - 2z = 9$$

$$3x - 17y + 8z = 49$$

$$3x - 4y + z = c$$

do not have a unique solution. For what values of c will they have (a) no solution, (b) an infinite number of solution. For (b) obtain the general solution.

4. (1) For each of the following pairs of vectors, find out whether the angle between them is acute, obtuse or right:

$$a) \mathbf{u} = (1, 0) \quad \mathbf{v} = (2, 2); \quad b) \mathbf{u} = (1, -1, 0) \quad \mathbf{v} = (1, 2, 1).$$

(2) Find the parametric equation and the nonparametric equation of the plane through the point $(1,3,2)$ and normal to the vector $(1,-1,0)$.

5. Exercise 11.2 on Simon and Blume page 243.

Extra questions

1. Prove Theorem 5 and the properties of determinants preceding Theorem 5.