EE112 – Engineering Mathematics II

Problem Set 11

Due by 5pm on Friday, 4 May 2018

1. Find the inverses of the following matrices using the adjugate method:

   (a) $\begin{pmatrix} 1 & 5 & 2 \\ 2 & 11 & 4 \\ 0 & 2 & -1 \end{pmatrix}$
   (b) $\begin{pmatrix} 0 & 8 & 0 \\ 0 & 0 & 4 \\ 2 & 0 & 0 \end{pmatrix}$

2. Find the inverses of the following matrices using Gauss-Jordan reduction:

   (a) $\begin{pmatrix} 2 & 3 \\ -2 & 7 \end{pmatrix}$
   (b) $\begin{pmatrix} 2 & 0 & 1 \\ -3 & 3 & -1 \\ 0 & -4 & 1 \end{pmatrix}$

3. (a) Write the following systems of equations in matrix form:

   (i) $8x - 2y = 1,\ -4x + y = -10$

   (ii) $3x_1 + x_2 - x_3 = 20,\ x_1 - 2x_3 = 16$

   (iii) $2u + w = -1,\ u + 3v - w = -12,\ -5u - 4v + 3w = 32$

   (b) One of the matrix equations in (a) has a unique solution, Determine which it is, and use both the inverse-matrix and the Gauss-Jordan elimination methods to find the solution. (You should, of course, get the same solution from both methods.)