Assignment No. 7	**MATHEMATICS 2050**	Fall 2004

Due as follows:

Dr. Kondratieva	Tuesday November 2	in class or assignment box #47
Dr. Goodaire	Wednesday November 3	10:00 a.m.
Dr. Yuan	Wednesday November 3	in class

[2] 1. Suppose A is an $n \times n$ matrix such that $A + A^2 = I$. Show that A is invertible.

[2] 2. If A and B are matrices with both AB and B invertible, prove that A is invertible.

3. Solve each of the following systems of linear equations by Gaussian elimination and back substitution. Write your answers as vectors or as linear combinations of vectors if appropriate.

[2] (a)
$$\begin{aligned} 2x - y + 2z &= -4 \\ 3x + 2y &= 1 \\ x + 3y - 6z &= 5 \end{aligned}$$

[2] (b)
$$\begin{aligned} x + y + 7z &= 2 \\ 2x - 4y + 14z &= -1 \\ 5x + 11y - 7z &= 8 \\ 2x + 5y - 4z &= -3 \end{aligned}$$

[3] (c)
$$\begin{aligned} 2x_1 + 2x_2 + 2x_3 - 8x_4 &= 1 \\ 4x_1 + 6x_2 + 6x_3 &= 4 \\ 6x_1 + 6x_2 + 10x_3 - 4x_4 &= 2 \end{aligned}$$

[1] (d) $x - y + 2z = 4$

[3] (e)
$$\begin{aligned} 2x_1 - 7x_2 + x_3 + x_4 &= 0 \\ x_1 - 2x_2 + x_3 &= 0 \\ 3x_1 + 6x_2 + 7x_3 - 4x_4 &= 0 \end{aligned}$$

[3] (f)
$$\begin{aligned} 2x_1 - 3x_2 + 4x_3 - x_4 &= 5 \\ -x_1 + x_2 + x_4 &= -1 \\ 2x_2 - x_3 - 3x_4 &= 1 \\ 3x_1 + x_3 + 4x_4 &= 7 \end{aligned}$$

[3] 4. Determine whether or not $\begin{bmatrix} 2 \\ -11 \\ -3 \end{bmatrix}$ is a linear combination of the columns of

$$A = \begin{bmatrix} 0 & -1 \\ -1 & 4 \\ 5 & 9 \end{bmatrix}.$$

[21]

