Norwegian University of Science and Technology
Departement of Mathematical Sciences

TMA4110 Calculus 3 Autumn 2010

Exercise set 7 – Week 40

Edwards & Penney, section 2.1

5,17,31

Edwards & Penney, section 2.2

8,15,22

Edwards & Penney, section 2.3

9,26,27

Exam problems

A-49 A real $n \times n$-matrix A satisfies

$$A^2 = A.$$

Show that the determinant of A is either 0 or 1. Show that if $\det A = 1$, then $A = I$ (the identity matrix). Suppose that $\det A = 0$; does A have to be the zero matrix? Justify your answer.

Multiple-choice questions

1 Determine the reduced echelon form of the matrix

$$\begin{bmatrix} 1 & 3 & 3 & 6 \\ 2 & 6 & 7 & 10 \\ 1 & 3 & 1 & 10 \end{bmatrix}.$$

A: $\begin{bmatrix} 1 & 3 & 3 & 6 \\ 0 & 0 & 1 & -2 \\ 0 & 0 & 0 & 0 \end{bmatrix}$ **B:** $\begin{bmatrix} 1 & 3 & 0 & 0 \\ 0 & 0 & 1 & -2 \\ 0 & 0 & 0 & 0 \end{bmatrix}$ **C:** $\begin{bmatrix} 1 & 0 & 0 & 4 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$ **D:** $\begin{bmatrix} 1 & 3 & 0 & 12 \\ 0 & 0 & 1 & -2 \\ 0 & 0 & 0 & 0 \end{bmatrix}$

2 For what values of the constant k is the matrix

$$\begin{bmatrix} 1 & -1 & 1 \\ 1 & k & 4 \\ k & 1 & 5 \end{bmatrix}$$

not invertible?

A: $k = 2$ **B:** $-1 \leq k \leq 2$ **C:** $k = -1$ **D:** $k = 2$ og $k = -1$.