KJ1041 - Øving 2

Oppgave 3.1

a)

$$\begin{bmatrix} 0 & 1 & 1 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix} \cdot \begin{bmatrix} a \\ b \\ c \\ d \\ e \\ f \\ g \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$$

$a, b, c, d, e, f, g = 0$ er en gyldig løsning.

b)

$$\begin{bmatrix} 8 & -7 & 0 \\ -8 & -7 & 3 \\ -4 & 5 & -8 \\ -6 & 6 & -4 \end{bmatrix} \cdot \begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} -3 \\ -7 \\ -3 \\ 0 \end{bmatrix}$$

$$8a - 7b = 3 \quad -8a - 7b + 3c = -7 \quad -4a + 5b - 8c = -3 \quad -6a + 6b - 4c = 0$$

$$\left[\begin{array}{ccc|c} 8 & -7 & 0 & 3 \\ -8 & -7 & 3 & -7 \\ -4 & 5 & -8 & -3 \\ -6 & 6 & -4 & 0 \end{array}\right] = \left[\begin{array}{ccc|c} 1 & 0 & 0 & \frac{83}{215} \\ 0 & 1 & 0 & \frac{187}{215} \\ 0 & 0 & 1 & \frac{156}{215} \\ 0 & 0 & 0 & 0 \end{array}\right]$$

Oppgave 3.2

Oppgave 3.3

a)

Dette er ekvivalent med matrisen

$$\left[\begin{array}{cc|c} 1 & 4 & 1 \\ 5 & 18 & 8 \\ -3 & 4 & 2 \end{array}\right] = \left[\begin{array}{cc|c} 1 & 0 & -1/4 \\ 0 & 1 & 5/16 \\ 5 & 18 & 8 \end{array}\right]$$

Nei, det er ingen tall som gir rett svar for alle tre verdiene.

b)

$$\left[\begin{array}{ccc|c} 1 & 4 & a & d \\ 5 & 18 & b & e \\ -3 & 4 & c & f \end{array}\right] = \left[\begin{array}{ccc|c} 1 & 0 & \frac{a-c}{4} & x_a \\ 0 & 1 & \frac{4b+5(c-a)}{72} & x_b \\ 0 & 0 & c & x_c \end{array}\right]$$

Siste likhet er gitt ved at $\frac{a-c}{4} = \frac{4b-5(c-a)}{72} = 0$. Da er $a = c = 0$ og $b = 0$, som gir polynomet $x^2 + 1$.

Oppgave 4.1

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} \cdot \begin{bmatrix} e \\ f \end{bmatrix} = \begin{bmatrix} 1 \\ -1 \end{bmatrix}$$

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} \cdot \begin{bmatrix} g \\ h \end{bmatrix} = \begin{bmatrix} 2 \\ 3 \end{bmatrix}$$

$$ae + bf = 1 \qquad ce + df = -1 \qquad ag + bh = 2 \qquad cg + dh = 3$$

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} \cdot \begin{bmatrix} 2e - g \\ 2f - h \end{bmatrix}$$

$$2ae - ag + 2bf - bh = 2(ae + bf) - (ag + bh) = 0$$

$$2ce - cg + 2df - dh = 2(ce + df) - (cg + dh) = -5$$

$$A\mathbf{w} = \begin{bmatrix} 0 \\ -5 \end{bmatrix}$$

Oppgave 4.2

a)