TMA4110 - Martin Skatvedt - Innlevering 3

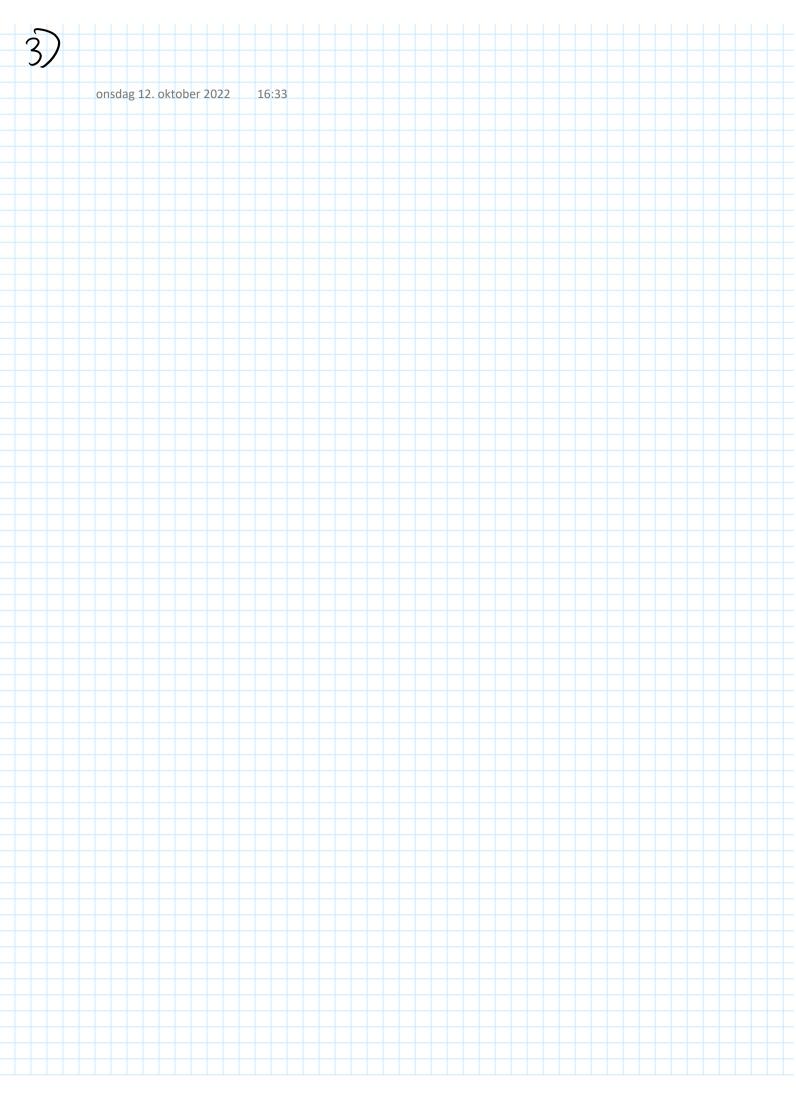
tirsdag 11. oktober 2022 12:29

1) $0 \cdot \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$

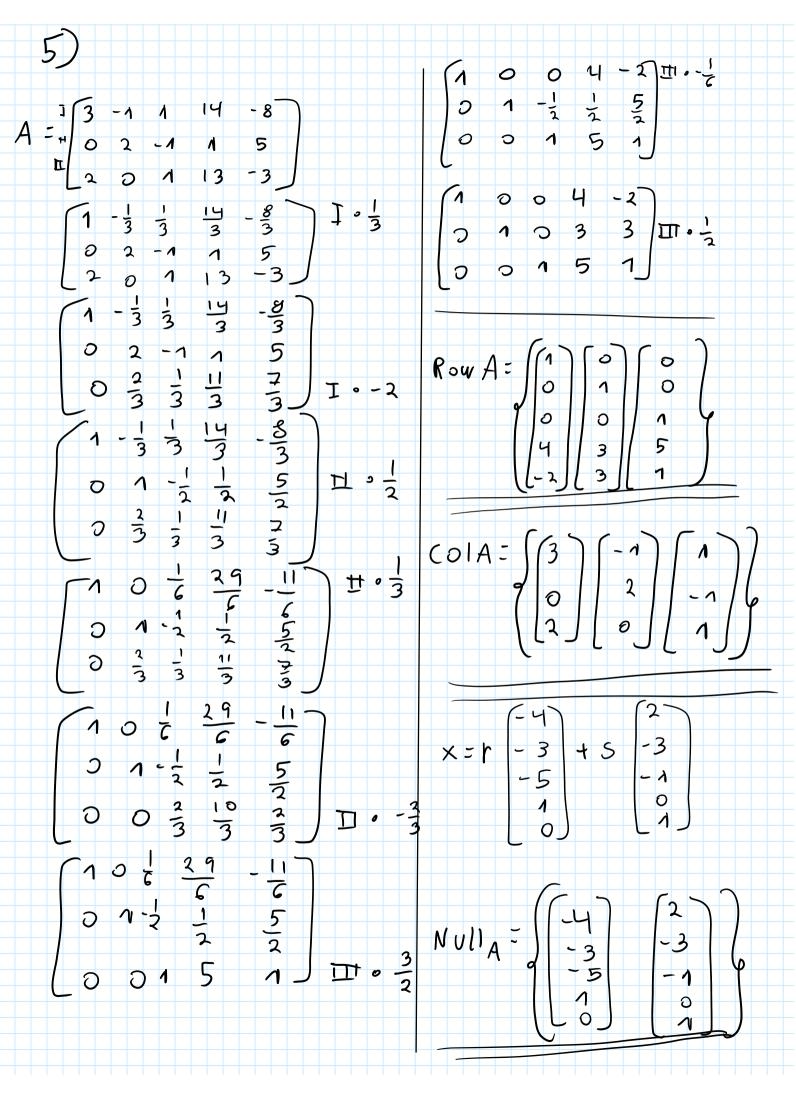
0 : skalaren o

0 = nullvektor

- 2) 1. Null Vektor i Mn ligger i alle nedre triangulære nxn matis er
 - 2. Summen av to nedre triangulære nxn matriser er tortsatt en nedre triangulær nxn matrise
 - 3. Produktet av to
 nedre triansulære nxn
 matriser er forsatt en
 nedre triangulær nxn matrise



onsdag 12. oktober 2022 15:10 RowA: Sp -6 Nulla 11 0-3 0 dim ColA -M Ш



$$B = \begin{pmatrix} 1 & 2 & 3 \\ -2 & 3 & 4 \\ 3 & -4 & 5 \\ 4 & -5 & 6 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & 7 & 10 \\ 4 & -5 & 6 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & 7 & 10 \\ 0 & 10 & 7 \\ 0 & 13 & 6 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & 10 & 7 \\ 0$$

- a) Maks dim ColA=4, siden
 det kan være maks 4
 pivot elementer
- (b) dim (ola: n-dim Nulla: 3 vi har 3 kolonner med vivot clementer, så 3 liheart vavhegige kolonner

- d) Rank AT = 4-3=1 DUS d.m Row AT = 1
- e) sim Null A > 0 siden maks

 Rank = 4.

 Null A kan ikke vare {03

onsdag 12. oktober 2022

15:49

3 = n x n

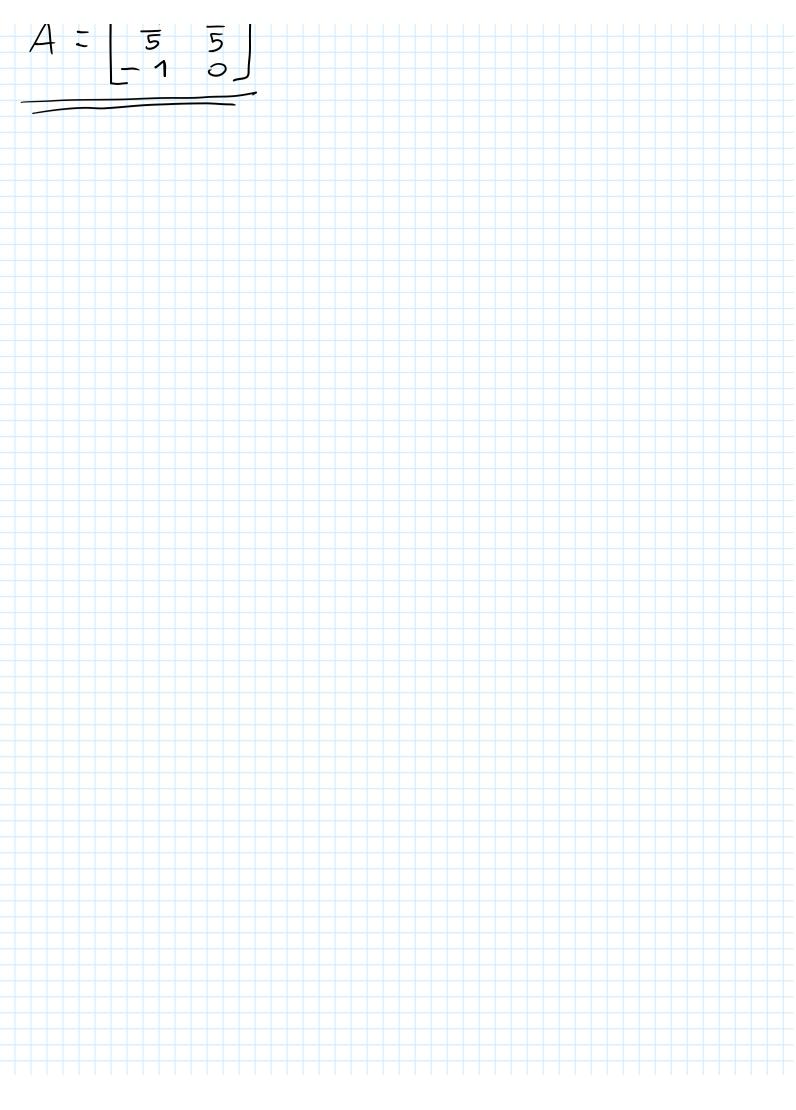
5. den Ber et tvadrat

har det full rang, dus

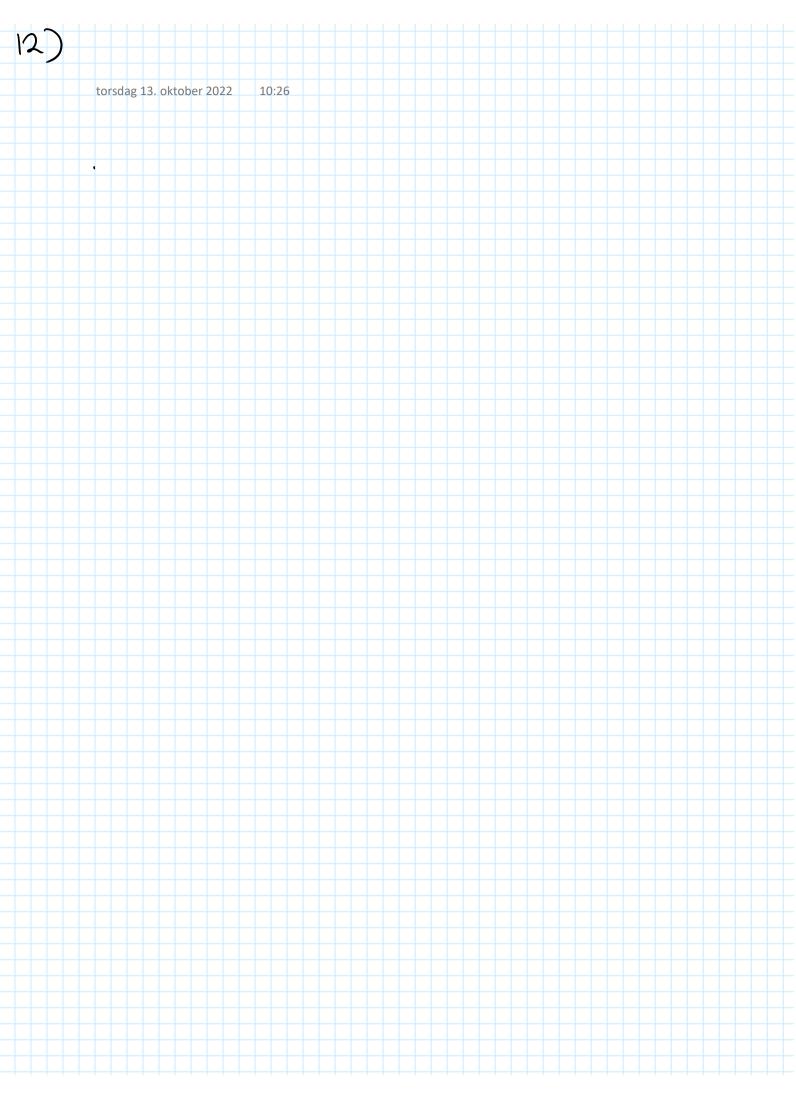
Ranky = n, da må

dim Nully = 0 5 a

Null B = null vektor med n elementer



(11 torsdag 13. oktober 2022 $B = \left(\begin{bmatrix} 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 0 \\ 2 \end{bmatrix} \right) \quad C = \left(\begin{bmatrix} 2 \\ 3 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \end{bmatrix} \right)$ $\begin{bmatrix} b_1 & b_2 & 1 & C_1 & C_2 \end{bmatrix} \sim \begin{bmatrix} 1 & 0 & | & 2 & 1 \\ 1 & 2 & | & 3 & 0 \end{bmatrix}$



torsdag 13. oktober 2022 10:27 B= (1, cosx, cos2x) T: V-V R3 T; a+6co5x+cco52x-v 2a+6 (a) $\cos^2 x = \underbrace{1 + \cos 2x}_{2} = \underbrace{\frac{1}{2} + \cos x}_{2} + \underbrace{\cos 2x}_{2}$ $\begin{bmatrix} c \circ s^{2} \\ \end{bmatrix}_{\mathcal{B}} = \begin{bmatrix} \frac{1}{2} \\ 0 \\ \frac{1}{2} \end{bmatrix}$ $\begin{bmatrix} Sin^2x \end{bmatrix}_{B} = \begin{bmatrix} \frac{1}{2} \\ 0 \end{bmatrix}$ D (v) B = [a] (v) B = [d] (v) B + [v] B = [a+d] b + e c + f $T([U]_{B}) = \begin{bmatrix} c \\ 2a+b \\ b-3c \end{bmatrix} \quad T([V]_{B}) = \begin{bmatrix} f \\ 2d+e \\ e-3f \end{bmatrix}$ T ([] g + [V] g) = [c+f 2(a+d)+b+e b+e-3(c+f)] $T([V]_Q) + T([V]_Q) = \begin{bmatrix} c+f \\ 2a+b+2d+e \\ b-3c+e-3f \end{bmatrix} = \begin{bmatrix} c+f \\ 2(a+d)+b+e \\ b+e-3(c+f) \end{bmatrix}$ T (U+V) = T (U) +T (U) for alle V 09 U i V

$$C_{i}^{C}UJ_{B}: \begin{bmatrix} c_{i}a \\ c_{i}b \\ c_{i}c \end{bmatrix}$$

$$TC(a_{i}^{C}UJ_{B}): \begin{bmatrix} c_{i}a \\ c_{i}b \\ c_{i}b \\ c_{i}b \end{bmatrix} = \begin{bmatrix} c_{i}a \\ c_{i}b \\ c_{i}b \end{bmatrix} = \begin{bmatrix} c_{i}a \\ c_{i}b \\ c_{i}b \end{bmatrix} = \begin{bmatrix} c_{i}a \\ c_{i}b \\ c_{i}b \end{bmatrix}$$

$$C_{i} \cdot T(CUJ_{D}): C_{i} \cdot \begin{bmatrix} c_{i}a \\ c_{i}b \\ c_{i}b \end{bmatrix} = \begin{bmatrix} c_{i}a \\ c_{i}b \\ c_{i}b \end{bmatrix}$$

$$T(c_{i}U): C_{i}^{C}UJ_{D} = c_{i}^{C}T(U) \quad \text{for all } c \quad U \quad \text{og } c_{i} \quad V$$

d) L; V+> R

torsdag 13. oktober 2022 1443

L(f) =
$$\int_{-\pi}^{\pi} f(x) \cos(x) dx$$

L(cosx) = $\int_{-\pi}^{\pi} \cos^2 x dx = \int_{-\pi}^{\pi} \frac{1 + \cos^2 x}{2} dx$

= $\frac{1}{2} \int_{-\pi}^{\pi} 1 + \cos^2 x dx = \frac{1}{2} \left(\int_{-\pi}^{\pi} 1 dx + \int_{-\pi}^{\pi} \cos^2 x dx \right)$

$$\int_{-\pi}^{\pi} 1 dx = \left[x \right]_{-\pi}^{\pi} = \pi - (-\pi) + 2\pi$$

$$\int_{-\pi}^{\pi} \cos^2 x dx = \int_{-\pi}^{\pi} \cos^2 x dx = \frac{1}{2} \left[\sin^2 x \right]_{-\pi}^{\pi} = \frac{1}{2} \int_{-\pi}^{\pi} \cos^2 x dx = \frac{1}{2} \left[\sin^2 x \right]_{-\pi}^{\pi} = \frac{1}{2} \left[\cos^2 x \right]_{-\pi}^{\pi} = \frac{1}{2} \left$$

torsdag 13. oktober 2022 14:57

e) $f: \alpha+b \cos x + c \cos x + c \cos x$ Lef) $: L(\alpha+b \cos x + c \cos 2x) = \int (\alpha+b \cos x + c \cos x) \cdot \cos x dx$ $\int_{-\pi}^{\pi} \cos x + b \cos^2 x + c \cos x \cdot \cos (x) dx$ = \int \acos x dx + \int \bcos \frac{2}{xbd} \int \cos x \cos 2 x dx $\int_{-\pi}^{\pi} a \cos x \, dx = a \int_{-\pi}^{\pi} \cos x \, dx = a \left[\sin x \right]_{-\pi}^{\pi} : a \left(o - o \right) : \underline{o}$ $\int_{-\pi}^{\pi} \left(\cos^2 x \, dx \right) = \int_{-\pi}^{\pi} \left(\cos^2 x \, dx \right) = \int_{-$ Scosx.cos2xdx = CScosx.cos2xdx U= cos 2x v= co 5 x $\begin{bmatrix} \cos 2x \sin x & \sin x & dx \\ -\sin x & -\sin x & dx \end{bmatrix}$ v : sin x U' = -2 Sin 2x (1) -2 Sin 2x Sin x dx = -2 Cosx2sin2x dx U=sin × dx: ____ $- \cdot 4 \int_{-3\pi}^{3\pi} u^{2} du - \cdot 4 \left[\frac{u^{3}}{3} \right]_{-3\pi}^{\pi} = -4 \left[\frac{\sin x}{3} \right]_{-3\pi}^{\pi} = -4 \left[\frac{\sin x}{3} \right]_{-3\pi}^{\pi} = \frac{\sin x}{3}$ cos(-21) sin(-1)=0 [(a+6 cosx+c cos 2x) = 77 b

torsdag 13. oktober 2022 15:19 L(f) = 0 må b=0 For at ker L = alle f i V hvor f= a+ccos 2x for alle reelle a 09 C d:m (ker L) = 2 14) a) SCTCV))= V gir injektivitet T(s(w)) = w gir surjektivitet b) im T = x c) Ja, siden Ser en invers au T † (V) = 0 -0 V = 0 T (SCW) = 0 -0 SCW = 0 -0 W = 0