Oblig 3

oblig3.m *

/MATLAB Drive/oblig3.m

```
1   %Input for matrise A
2   A = input('Skriv inn matrise A: ');
3   %Input for søylevektor b
4   b = input('Skriv inn soylevektor b: ');
5
6   %Finner determinanten til A
7   %Dersom svaret blir 0, så
8   %er den ikke entydig
9   determinant = det(A)
10  if determinant == 0
11      disp('Ikke entydig!')
12      return
13  end
14
15  %Lager totalmatrisen
16  T = [A b];
17
18  %Og gjør om til redusert trappeform RT
19  RT = rref(T)
20
```

Eks1

```
>> oblig3
Skriv inn matrise A:
[4,3;2,1]
Skriv inn soylevektor b:
[2;1]

determinant =

    -2


RT =

    1.0000         0    0.5000
         0    1.0000         0

>>
```

Eks. 1

$\begin{bmatrix} 4 & 3 \\ 2 & 1 \end{bmatrix}$ MATRISE A

$\begin{bmatrix} 2 \\ 1 \end{bmatrix}$ Søyle-vektor b

$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$ Ukjente...

Determinant: $4 \cdot 1 - 2 \cdot 3 = 4 - 6 = \underline{-2}$

Total matrise: $\begin{bmatrix} 4 & 3 & 2 \\ 2 & 1 & 1 \end{bmatrix}$

Redusert trappeform:

$$\begin{bmatrix} 4 & 3 & 2 \\ 2 & 1 & 1 \end{bmatrix} \overset{\frac{R1}{4}}{\sim} \begin{bmatrix} 1 & \frac{3}{4} & \frac{1}{2} \\ 2 & 1 & 1 \end{bmatrix} \overset{R2-2R1}{\sim}$$

$$\begin{bmatrix} 1 & \frac{3}{4} & \frac{1}{2} \\ 0 & -\frac{1}{2} & 0 \end{bmatrix} \overset{\frac{R2}{-\frac{1}{2}}}{\sim} \begin{bmatrix} 1 & \frac{3}{4} & \frac{1}{2} \\ 0 & 1 & 0 \end{bmatrix} \overset{R1-\frac{3}{4}R2}{\sim} \begin{bmatrix} 1 & 0 & \frac{1}{2} \\ 0 & 1 & 0 \end{bmatrix}$$

$$\boxed{\begin{aligned} x_1 &= \frac{1}{2} \\ x_2 &= 0 \end{aligned}} \longrightarrow \text{Entydig Løsning.}$$

Eks2

```
>> oblig3
Skriv inn matrise A:
[2,1,0;4,1,2;3,2,0]
Skriv inn soylevektor b:
[2;1;1]

determinant =

   -2.0000


RT =

    1.0000         0         0    3.0000
         0    1.0000         0   -4.0000
         0         0    1.0000   -3.5000
```

EKS.2

$$\begin{bmatrix} 8 & -2 & 4 \\ 9 & 2 & 4 \\ -5 & 2 & 4 \end{bmatrix} \quad \begin{bmatrix} 2 & 1 & 0 \\ 4 & 1 & 2 \\ 3 & 2 & 0 \end{bmatrix} \quad \begin{bmatrix} 2 \\ 1 \\ 1 \end{bmatrix} \quad \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$

~~Matrise A~~ MATRISE A — SØYLE-VEKTOR b

TOTAL MATRISE:

$$\begin{bmatrix} 2 & 1 & 0 & 2 \\ 4 & 1 & 2 & 1 \\ 3 & 2 & 0 & 1 \end{bmatrix}$$

Redusert trappeform:

$$\begin{bmatrix} 2 & 1 & 0 & 2 \\ 4 & 1 & 2 & 1 \\ 3 & 2 & 0 & 1 \end{bmatrix} \xrightarrow[\sim]{\frac{R1}{2}} \begin{bmatrix} 1 & \frac{1}{2} & 0 & 1 \\ 4 & 1 & 2 & 1 \\ 3 & 2 & 0 & 1 \end{bmatrix} \xrightarrow{R2-4R1} \sim$$

$$\begin{bmatrix} 1 & \frac{1}{2} & 0 & 1 \\ 0 & -1 & 2 & -3 \\ 3 & 2 & 0 & 1 \end{bmatrix} \xrightarrow[\sim]{R3-3R1} \begin{bmatrix} 1 & \frac{1}{2} & 0 & 1 \\ 0 & -1 & 2 & -3 \\ 0 & \frac{1}{2} & 0 & -2 \end{bmatrix} \xrightarrow[\sim]{\frac{R2}{-1}} \begin{bmatrix} 1 & \frac{1}{2} & 0 & 1 \\ 0 & 1 & -2 & 3 \\ 0 & \frac{1}{2} & 0 & -2 \end{bmatrix}$$

$$\begin{matrix} R1-\frac{1}{2}R2 \\ \sim \\ R3-\frac{1}{2}R2 \end{matrix} \begin{bmatrix} 1 & 0 & 1 & -\frac{1}{2} \\ 0 & 1 & -2 & 3 \\ 0 & 0 & 1 & -\frac{7}{2} \end{bmatrix} \xrightarrow[\sim]{R1-R3} \begin{bmatrix} 1 & 0 & 0 & 3 \\ 0 & 1 & 0 & -4 \\ 0 & 0 & 1 & -\frac{7}{2} \end{bmatrix} \xrightarrow{R2+2R3}$$

$$\boxed{\begin{aligned} x_1 &= 3 \\ x_2 &= -4 \\ x_3 &= -\frac{7}{2} \end{aligned}} \rightarrow \text{Entydig}$$

Eks3

```
>> oblig3
Skriv inn matrise A:
[2,4;1,2]
Skriv inn soylevektor b:
[1;0]

determinant =

     0

Ikke entydig!
>>
```

Eks 3 $\begin{bmatrix} 2 & 4 \\ 1 & 2 \end{bmatrix}$ $\begin{bmatrix} 1 \\ 0 \end{bmatrix}$ $\begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$

MATRISE A

Søyle-vektor b

Determinant: $2 \cdot 2 - 4 \cdot 1 = 0$

Totalmatrise: $\begin{bmatrix} 2 & 4 & 1 \\ 1 & 2 & 0 \end{bmatrix}$

Redusert trappeform:

$$\begin{bmatrix} 2 & 4 & 1 \\ 1 & 2 & 0 \end{bmatrix} \overset{\frac{R1}{2}}{\sim} \begin{bmatrix} 1 & 2 & \frac{1}{2} \\ 1 & 2 & 0 \end{bmatrix} \overset{R2-R1}{\sim} \begin{bmatrix} 1 & 2 & \frac{1}{2} \\ 0 & 0 & -\frac{1}{2} \end{bmatrix}$$

Ikke entydig, Pga. $0 \neq 0{,}5$

$0x_1 + 0x_2 = -\frac{1}{2}$