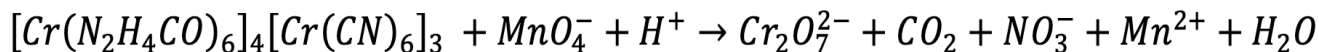


Afstemning af verdens "sværeste" reaktion vha. lineær algebra



Pakker loades:

```
restart
with(Gym) :
visMatrix(10) :
with(LinearAlgebra) :
with(NumberTheory) :
```

Matricen defineres:

$$A := \begin{bmatrix} 7 & 0 & 0 & -2 & 0 & 0 & 0 & 0 \\ 66 & 0 & 0 & 0 & 0 & -1 & 0 & 0 \\ 96 & 0 & 1 & 0 & 0 & 0 & 0 & -2 \\ 42 & 0 & 0 & 0 & -1 & 0 & 0 & 0 \\ 24 & 4 & 0 & -7 & -2 & -3 & 0 & -1 \\ 0 & 1 & 0 & 0 & 0 & 0 & -1 & 0 \\ 0 & -1 & 1 & 2 & 0 & 1 & -2 & 0 \end{bmatrix} :$$

Der laves Gauss elimination på matricen:

GaussianElimination(A)

$$\begin{bmatrix} 7 & 0 & 0 & -2 & 0 & 0 & 0 & 0 \\ 0 & 4 & 0 & -\frac{1}{7} & -2 & -3 & 0 & -1 \\ 0 & 0 & 1 & \frac{192}{7} & 0 & 0 & 0 & -2 \\ 0 & 0 & 0 & 12 & -1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{11}{7} & -1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{565}{528} & -1 & \frac{1}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1879}{565} & \frac{1176}{565} \end{bmatrix}$$

(1)

x8 sættes til at være k, og de øvrige koefficienter findes vha. ligningsløsning:

$$x8 := k :$$

$$x7 := \text{solve}\left(-\frac{1879}{565} \cdot x7 + \frac{1176}{565} \cdot x8 = 0, x7\right)$$

$$x7 := \frac{1176 k}{1879} \quad (2)$$

$$x6 := \text{solve}\left(\frac{565}{528} \cdot x6 - 1 \cdot x7 + \frac{1}{4} \cdot x8 = 0, x6\right)$$

$$x6 := \frac{660 k}{1879} \quad (3)$$

$$x5 := \text{solve}\left(\frac{11}{7} \cdot x5 - 1 \cdot x6 = 0, x5\right)$$

$$x5 := \frac{420 k}{1879} \quad (4)$$

$$x4 := \text{solve}(12 \cdot x4 - 1 \cdot x5 = 0, x4)$$

$$x4 := \frac{35 k}{1879} \quad (5)$$

$$x3 := \text{solve}\left(1 \cdot x3 + \frac{192}{7} \cdot x4 - 2 \cdot x8 = 0, x3\right)$$

$$x3 := \frac{2798 k}{1879} \quad (6)$$

$$x2 := \text{solve}\left(4 \cdot x2 - \frac{1}{7} \cdot x4 - 2 \cdot x5 - 3 \cdot x6 - 1 \cdot x8 = 0, x2\right)$$

$$x2 := \frac{1176 k}{1879} \quad (7)$$

$$x1 := \text{solve}(7 \cdot x1 - 2 \cdot x4 = 0, x1)$$

$$x1 := \frac{10 k}{1879} \quad (8)$$

Den mindste heltalsløsning må være k=1879. De øvrige koefficienter beregnes:

$$k := 1879 :$$

$$x7 = 1176$$

$$x6 = 660$$

$$x5 = 420$$

$$x4 = 35$$

$$x3 = 2798$$

$$x2 = 1176$$

$$x1 = 10$$