

Uge07 SD E16, opgave 6b

```
> restart
```

```
> with(LinearAlgebra) :
```

```
> a1 := <1, 0, 1, 0, 1, 0> : a2 := <0, 1, 1, 1, 1, -1> : b1 := <4, -5, -1, -5, -1, 5> : b2 := <-3, 2, -1, 2, -1, -2> :
```

```
> M1 := <a1|a2|b1|b2>
```

$$M1 := \begin{bmatrix} 1 & 0 & 4 & -3 \\ 0 & 1 & -5 & 2 \\ 1 & 1 & -1 & -1 \\ 0 & 1 & -5 & 2 \\ 1 & 1 & -1 & -1 \\ 0 & -1 & 5 & -2 \end{bmatrix} \quad (1)$$

```
> Rank(M1)
```

$$2 \quad (2)$$

```
> ReducedRowEchelonForm(M1)
```

$$\begin{bmatrix} 1 & 0 & 4 & -3 \\ 0 & 1 & -5 & 2 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix} \quad (3)$$

Dvs. b'erne kan skrives som en linearkombination af a'erne.

```
> M2 := <b1|b2|a1|a2>
```

$$M2 := \begin{bmatrix} 4 & -3 & 1 & 0 \\ -5 & 2 & 0 & 1 \\ -1 & -1 & 1 & 1 \\ -5 & 2 & 0 & 1 \\ -1 & -1 & 1 & 1 \\ 5 & -2 & 0 & -1 \end{bmatrix} \quad (4)$$

```
> Rank(M2)
```

$$2 \quad (5)$$

```
> ReducedRowEchelonForm(M2)
```

(6)

$$\begin{bmatrix} 1 & 0 & -\frac{2}{7} & -\frac{3}{7} \\ 0 & 1 & -\frac{5}{7} & -\frac{4}{7} \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

(6)

Dvs. a'erne kan skrives som en linearkombination af b'erne.

Konklusion: a'erne og b'erne udspænder samme underrum!