

# Testaufgabe SW6

## Felix Rohrer

601

```
> restart; with(linalg) :
```

```
> A := matrix(2, 3, [1, 2, 3, -1, 0, 2])
```

$$A := \begin{bmatrix} 1 & 2 & 3 \\ -1 & 0 & 2 \end{bmatrix}$$

(1.1)

```
> B := matrix(2, 3, [-1, 5, -2, 2, 2, -1])
```

$$B := \begin{bmatrix} -1 & 5 & -2 \\ 2 & 2 & -1 \end{bmatrix}$$

(1.2)

a)

```
> W := A + B
```

$$W := A + B$$

(1.1.1)

```
> evalm(W)
```

$$\begin{bmatrix} 0 & 7 & 1 \\ 1 & 2 & 1 \end{bmatrix}$$

(1.1.2)

b)

Matrix Multiplikation: &\*

```
> U := transpose(A &* transpose(B))
```

$$U := \begin{bmatrix} 3 & -3 \\ 3 & -4 \end{bmatrix}$$

(1.2.1)

```
> evalm(U) :
```

c)

```
> V := B &* transpose(A)
```

$$V := B \&* \begin{bmatrix} 1 & -1 \\ 2 & 0 \\ 3 & 2 \end{bmatrix}$$

(1.3.1)

```
> evalm(V)
```

$$\begin{bmatrix} 3 & -3 \\ 3 & -4 \end{bmatrix}$$

(1.3.2)

## 602

```
[> restart; with(linalg) :
> A := matrix(3, 3, [1, -2, 5, -2, 3, 0, 5, 0, 2])
```

$$A := \begin{bmatrix} 1 & -2 & 5 \\ -2 & 3 & 0 \\ 5 & 0 & 2 \end{bmatrix} \quad (2.1)$$

```
> B := matrix(3, 3, [1, 2, 0, 2, 1, 4, 0, 4, 2])
```

$$B := \begin{bmatrix} 1 & 2 & 0 \\ 2 & 1 & 4 \\ 0 & 4 & 2 \end{bmatrix} \quad (2.2)$$

**a)**

```
[> det(A)
```

$$-77 \quad (2.1.1)$$

**b)**

```
> U := inverse(A &* B)
```

$$U := \begin{bmatrix} -\frac{10}{77} & -\frac{2}{77} & \frac{1}{7} \\ \frac{2}{77} & -\frac{1}{77} & \frac{2}{77} \\ \frac{1}{22} & \frac{1}{11} & -\frac{1}{22} \end{bmatrix} \quad (2.2.1)$$

```
[> evalm(U) :
```

**c)**

```
> V := inverse(A) &* inverse(B)
```

$$V := \begin{bmatrix} -\frac{6}{77} & -\frac{4}{77} & \frac{15}{77} \\ -\frac{4}{77} & \frac{23}{77} & \frac{10}{77} \\ \frac{15}{77} & \frac{10}{77} & \frac{1}{77} \end{bmatrix} \&* \begin{bmatrix} \frac{7}{11} & \frac{2}{11} & -\frac{4}{11} \\ \frac{2}{11} & -\frac{1}{11} & \frac{2}{11} \\ -\frac{4}{11} & \frac{2}{11} & \frac{3}{22} \end{bmatrix} \quad (2.3.1)$$

```
> evalm(V)
```

(2.3.2)



$$\begin{bmatrix} -\frac{10}{77} & \frac{2}{77} & \frac{1}{22} \\ -\frac{2}{77} & -\frac{1}{77} & \frac{1}{11} \\ \frac{1}{7} & \frac{2}{77} & -\frac{1}{22} \end{bmatrix}$$

(2.3.2)

## 603

Wir definieren die Koeffizientenmatrix A und den Vektor b der rechten Seite.

> *restart; with(linalg) :*

> *A := matrix(3, 3, [5, -3, -2, 3, -4, -3, 6, 5, -5])*

$$A := \begin{bmatrix} 5 & -3 & -2 \\ 3 & -4 & -3 \\ 6 & 5 & -5 \end{bmatrix}$$

(3.1)

> *b := vector(3, [7, 1, -8])*

$$b := \begin{bmatrix} 7 & 1 & -8 \end{bmatrix}$$

(3.2)

> *linsolve(A, b)*

$$\begin{bmatrix} 2 & -1 & 3 \end{bmatrix}$$

(3.3)