

Solutions 2 - Add-on

Donnerstag, 26. August 2021 17:52

Exercise 3: Matrix Multiplication

b. Matrix products

I give the results only here. For the technique of computing the matrix product, please have a look at the lectures or the solutions of problem a. online.

$$1. \quad AB = \begin{pmatrix} 5 & 1 \\ 4 & -1 \end{pmatrix}$$

$$2. \quad BA = \begin{pmatrix} 3 & 3 & 0 \\ 0 & -3 & -3 \\ -4 & 0 & -4 \end{pmatrix}$$

$$3. \quad B^T A^T = (AB)^T = \begin{pmatrix} 5 & 4 \\ 1 & -1 \end{pmatrix}$$

use the transpose rule to avoid multiplying out

4. does not exist (dimension mismatch)

$$5. \quad AB + C = \begin{pmatrix} 0 & 4 \\ 6 & 3 \end{pmatrix}$$

$$6. \quad (AB + C)^T = \begin{pmatrix} 0 & 6 \\ 4 & 3 \end{pmatrix}$$

c. Dimensionality

A is of dimension 2×3 . A vector should be of length 3 (i.e., a matrix of dimension 3×1) to be right-multiplied to A. For A' , which is of dimension 3×2 , the vector must be of length 2.

Exercise 4: Elementary operations

$$1. E_1 = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix}$$

$$2. E_2 = \begin{pmatrix} 5 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 5 \end{pmatrix}$$

$$3. E_3 = \begin{pmatrix} 1 & 0 & 0 \\ -2 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$$E_3 A = \begin{pmatrix} a & b & c \\ (-2)a+b-0 \cdot c & (-2)d+e-0 \cdot h & (-2)c+f-0 \cdot i \\ g & h & i \end{pmatrix} \quad \checkmark$$