## Worksheet 10-25

**Exercise 0** Make sure you know what the following terms mean. Give two examples of a basis on  $\mathbb{R}^3$  and write down what each of these things is in those bases. Please check your understanding with a neighbor!

- basis
- coordinate vector of v in the basis B
- coordinate mapping
- change of basis matrix

**Exericise 1** Let  $B = \{b_1, \ldots, b_n\}$  be a basis for  $\mathbb{R}^n$ . Consider the linear transformation  $T : \mathbb{R}^n \to \mathbb{R}^n$  given by  $x \mapsto [x]_B$ , which takes x to its coordinate vector in the basis B. Find the matrix of this transformation with respect to the standard basis on both sides on  $\mathbb{R}^n$ .

**Exercise 2** Let V be a vector-space and  $B = \{b_1, \ldots, b_n\}$  be a basis. Show that the coordinate mapping  $T_B : V \to \mathbb{R}^n$  is one-to-one and onto.

**Exercise 3** Find the eigenvalues and eigenvectors of the following matrices. Write down an eigenbasis for both. Find the change of basis matrix from the eigenbasis of A to the eigenbasis of B. Use this to write down the matrix for A in the eigenbasis of B.

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	0	5	0	0	4	-1
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**Exercise 4** Do every true-false question on p. 390 (Ch. 6 Supplementary Exercises).