



LUDWIG-
MAXIMILIANS-
UNIVERSITÄT
MÜNCHEN

MATHEMATISCHES INSTITUT



Prof. Dr. Fabien Morel

Dr. Andrei Lavrenov, Oliver Hendrichs

Wintersemester 2024/25

14. Dezember 2024

Lineare Algebra I – Tutoriumsblatt 09

Aufgabe 1.

Consider the following basis in $V = \mathbb{R}^3$: $b_1 = (1, 0, 1)$, $b_2 = (2, -1, 1)$, $b_3 = (-1, 1, 3)$. Find the dual basis of V^* .

Aufgabe 2.

Consider the following basis of $\mathbb{R}^3$: $b_1 = (1, 0, 1)$, $b_2 = (1, 1, 1)$, $b_3 = (2, 1, 1)$. Find a transition matrix from the standard basis to this basis.

Aufgabe 3.

Assume that $f: U \rightarrow V$ is injective (resp., surjective). Prove that $f^*: V^* \rightarrow U^*$ is surjective (resp., injective).

Aufgabe 4.

Let $f: U_1 \rightarrow U_2$ be a linear map, $\mathcal{B}_i$ be a basis of U_i , $i = 1, 2$, and A be a matrix of f in these bases. Find the matrix of $f^*: U_2^* \rightarrow U_1^*$ in the dual bases.