Mathematics 2, Part 3 **2022/23**

Homework 6

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The homework consists of two problems. The solutions are to be submitted to the appropriate mailbox on Učilnica before the exam, but preferably in a week. The solutions should contain a clear and well explained proofs, procedures, explanations, etc.

(1) Show that every vector space V is isomorphic to $(V^*)^*$ by explicitly constructing the isomorphism.

(2) Find an inner product g on $\mathbb{R}^3$ for which basis

$$\mathcal{B} = \left\{ \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix} \right\}$$

is reciprocal to itself. Write an explicit formula for g.