

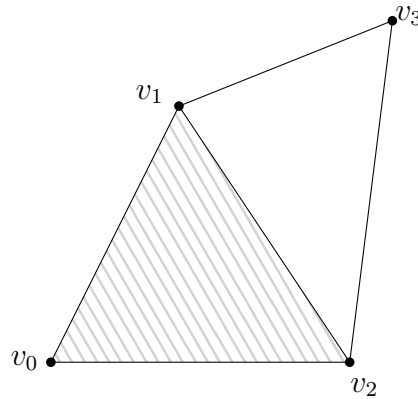
Discussion: 25.04. - 27.04.

Exercise Sheet 2

Exercise 2.1: Betti-Numbers

(4 Punkte)

Determine the Betti-numbers β_0 , β_1 and β_2 for the simplicial complex indicated below.



Exercise 2.2: Paths in simplicial complexes in \mathbb{R}^3

(4 Punkte)

Prove the following statement for any two vertices p and q of any simplicial complex C consisting of d -simplices with $d \leq 3$:

If there exists a path from p to q completely contained in C , then there also exists a path from p to q along edges (1-simplex faces) of C .

Exercise 2.3: Reminder: Matrix Properties

(4 Punkte)

Determine the rank, kernel and image of the following matrix:

$$A = \begin{pmatrix} 1 & 1 & 0 & 2 \\ 4 & 0 & 1 & 3 \\ 6 & 2 & 1 & 7 \\ 1 & 0 & 0 & 1 \end{pmatrix}$$