Proseminar
Topics in Discrete Mathematics (SS 2021)

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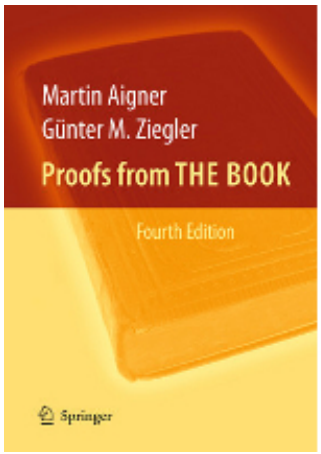
>> Paul Erdös liked to talk about THE BOOK, in which God maintains the perfect proofs for mathematical theorems, following the dictum of G. H. Hardy that there is no permanent place for ugly mathematics. Erdös also said that you need not believe in God but, as a mathematician, you should believe in THE BOOK. <<---- Martin Aigner, Günter M. Ziegler ----

Organizational meeting will take place the second half of February. The announcement will be made in https://www.math.kit.edu/iag6/~axenovich/en

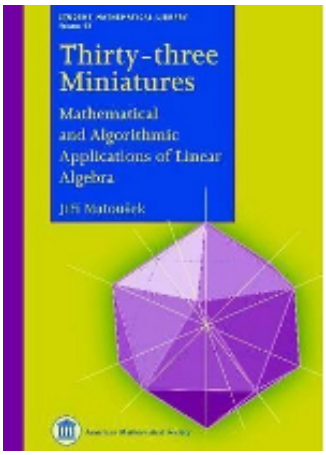
Description

In this proseminar we have a look at some beautiful gems in discrete mathematics: intriguing problems whose elegant solutions involve in particular clever mathematical applications of linear algebra. The material is taken from two popular books that offer, besides the mathematics, interesting background stories, illustrative examples and helpful pictures in still relatively short chapters.



"Proofs from THE BOOK"

by Martin Aigner and Günter M. Ziegler



"Thirty-three Miniatures: Mathematical and Algorithmic Applications of Linear Algebra"

by Jiri Matousek

Q1: Suppose you want to turn around a ladder of length 10 m inside your garden without lifting it. What is the smallest area of a garden in which this is possible?

Q2: Suppose you want to tile a rectangle of height 1 and irrational width x into squares, where squares may have irrational side lengths, but must be interior-disjoint and their union shall be the given rectangle. What is the minimum number of squares you need?