

SALZBURG MATHEMATICS COLLOQUIUM

Winter 2025/26

Ernst Rank (Technische Universität München)

„High order finite elements and geometric models – A long story with surprising twists and turns“

January 22, 2026

Abstract:

High-order finite element methods offer excellent accuracy and efficiency - provided that the geometry of the computational domain is precisely discretized. This requirement places high demands on mesh generation, which can only be met by specialized techniques with often laborious user interaction. This limitation has long hindered a wider application of high-order FEM in engineering practice. As surprising alternative for precise meshing, high-order immersed boundary methods have been developed, which do not meet the domain's boundary at all. Instead, the physical domain is embedded in a larger grid-like mesh, and the geometric model is only preserved on the level of element integration. It will be shown in this presentation that the 'variational crime' committed by this embedding can efficiently be controlled and all favorable properties of high-order FEM be restored.

Thursday, **15:00-15:45**

Hörsaal 414, 1. Stock