



# Optimality of adaptive finite element methods

**Organizers:**

Gregor Gantner (University of Bonn), Joscha Gedicke (University of Bonn)

**Venue:** Lipschitz lecture hall · Mathematics Center · Endenicher Allee 60 · 53115 Bonn

In practice, the solution of partial differential equations (PDEs) often exhibits geometry- or data-induced singularities. The goal of adaptive finite element methods (FEMs) is to automatically detect these singularities via a posteriori computable error estimators and to resolve them via local refinement of the underlying meshes. While for uniform mesh refinement, convergence to the exact solution follows readily from standard approximation results, the rigorous mathematical proof of convergence for adaptive mesh refinement is much more challenging. That being said, meanwhile it has been proved for certain classes of PDEs that adaptivity even leads to optimal convergence rates, i.e., to the best rates over all possible refinements. The primary objective of this summer school is to provide a comprehensive overview of the fundamental results of optimality of adaptive FEMs.

**Lecture Series by:**

- Carsten Carstensen (Humboldt University of Berlin)
- Lars Dening (Bielefeld University)
- Carlotta Giannelli (University of Florence)
- Christian Kreuzer (TU Dortmund)
- Dirk Praetorius (TU Wien)

**Additional talks by:**

- Ani Miraçi (TU Wien)
- Ngoc Tien Tran (University of Augsburg)
- Tabea Tscherpel (TU Darmstadt)



**Call for participation:** Participation is free. If you are interested in participating, please fill out the application form: <https://math-events.uni-bonn.de/event/55/abstracts/#submit-abstract>. Successful applicants are selected based on research background. To be considered, please submit a CV and research overview. To encourage the participation of researchers facing increased financial burden, such as many researchers from developing countries, a small number of fully funded places are available (including support for travel, accommodation). You can indicate in the application form, for which type of financial support you would like to be considered. Additional participants are welcome to join at their own cost.

**The deadline for applications to participate in the school is April 28, 2025 (CET).**