Numerical Methods for Partial Differential Equations

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Content

Elliptic Problems

- Approximation by means of the Galerkin method
- Finite elements and interpolation error
- Error estimates

Parabolic Problems

- Convergence analysis for the space semi-discretization
- Analysis of stability and convergence of the theta-method for time advancing

Optional topics

Mesh adaptivity and a posteriori error estimates

Mixed variational formulation

Eigenvalue problems

Introduction to the approximation of hyperbolic problems

References

- A. Quarteroni, **Numerical Models for Differential Problems**, Springer 2013.
- S. Larson, V. Thomée, **Partial differential equations with numerical methods**, *Texts in applied mathematics*, Springer 2005.
- A. Quarteroni, A. Valli, **Numerical approximation of partial differential equations**, Springer 1994.
- D. Boffi, F. Brezzi, M. Fortin, **Mixed Finite Element Methods and Applications**, Springer 2013.