

GASTVORTRAG

Die Arbeitsgruppe Numerical Analysis lädt zu folgendem Vortrag ein:

Marlis Hochbruck

Karlsruher Institut für Technologie

Efficient higher-order time integration schemes for Maxwell's equations with discontinuous Galerkin discretizations on locally refined grids

In this talk, we discuss the construction and analysis of higher-order time integration schemes for the full discretization of linear Maxwell equations on locally refined spatial grids. The scheme is based on a higher-order implicit method, e.g., an algebraically stable Runge–Kutta method. Our main contribution is to propose a preconditioned Krylov subspace method for solving the linear systems arising in each time step which is designed in such a way that its convergence only depends on the coarse mesh but not on the fine mesh. This is shown by approximation theory in the complex plane.

The advantage of this approach is that it is applicable to any implicit scheme and also works for exponential integrators, where the action of the matrix exponential is approximated by rational Krylov subspace methods. It is even applicable to nonlinear problems, where such linear systems arise within the Newton iterations.

Reference:

M. Hochbruck, J. Köhler, and P. M. Kumbhar. Preconditioned implicit time integration schemes for Maxwell's equations on locally refined grids. CRC 1173 Preprint 2022/29, Karlsruhe Institute of Technology, 2022.
URL <https://doi.org/10.5445/IR/1000148078>.

Zeit: **Freitag, 16. Mai 2025 um 10.15 Uhr**

Ort: **Technikerstr. 13a, HSB 6**

Gäste sind herzlich willkommen!

Alexander Ostermann