DK Seminar

May 25, 2016, 14:15 - 15:45
Vienna University of Technology,
Freihaus, green area, 4th floor, 101C

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The midpoint scheme for the Landau-Lifshitz-Gilbert equation

We consider the numerical approximation of the Landau-Lifshitz-Gilbert (LLG) equation in micromagnetics. The midpoint scheme ([1],[2]) is one of the two numerical schemes available on the mathematical market that are proven to be convergent towards a weak solution of the LLG equation. In this talk, we discuss the main features of the method: unconditional convergence, inherent preservation of the modulus constraint, a discrete energy equality which mimics the energy evolution of exact solutions, as well as strategies for the solution of the resulting nonlinear system of equations. This is joint work with Dirk Praetorius and Bernhard Stiftner (TU Wien).

References

[1] S. Bartels and A. Prohl. Convergence of an implicit finite element method for the Landau-Lifshitz-Gilbert equation. SIAM J. Numer. Anal. 44, 1405-1419, 2006.

[2] D. Praetorius, M. Ruggeri, and B. Stiftner. An extended midpoint scheme for the Landau-Lifshitz-Gilbert equation in computational micromagnetics. In preparation.