

## Optimal control in evolutionary micromagnetism

Andreas Prohl (U Tübingen, Germany)

We consider an optimal control problem subject to the Landau-Lifshitz-Gilbert equation (LLG)

$$\mathbf{m}_t = \alpha \mathbf{m} \times (\mathbf{m} \times \Delta \mathbf{m}) + \mathbf{m} \times (\Delta \mathbf{m} + \mathbf{u})$$

which describes the evolution of magnetizations  $\mathbf{m}$  in  $\mathbb{S}^2$ . Here  $\mathbf{u} : [0, T] \times \Omega \rightarrow \mathbb{R}^3$  is an applied field which is optimized according to some quadratic functional. The problem is motivated in order to control switching processes in ferromagnets.

A main focus in the talk is how to properly discretize the sphere property of solutions. Then, I discuss the optimality system for the optimal control problem, and a semi-discretization of it. I discuss convergence of the latter method. Computational studies will be shown.

This is joint work with T. Dunst, M. Klein, and A. Schaefer (U Tübingen).