



The Hong Kong Polytechnic University
Department of Applied Mathematics

Colloquium

On

Optimal control in evolutionary Micromagnetism

by

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Abstract

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

I start with a survey of existing numerical schemes which approximate solutions of LLG. A main focus here is 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. Schäfer (U Tübingen).

Date : 23 Sept, 2013 (Monday)

Time : 11:00 a.m. – 12:00 noon

Venue : HJ610, The Hong Kong Polytechnic University

***** ALL ARE WELCOME *****