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Proposal for a Standard Problem for Micromagnetic Simulations Including Spin-Transfer Torque — MASSOUD NAJAFI¹, BENJAMIN KRÜGER¹, STELLAN BOHLENS¹, MATTEO FRANCHIN², HANS FANGOHR², MARKUS BOLTE¹, ANTOINE VANHAVERBEKE³, ROLF ALLENSPACH³, ULRICH MERKT¹, DANIELA PFANNKUCHE¹, DIETMAR MÖLLER¹, and GUIDO MEIER¹ — ¹Universität Hamburg, Hamburg, Germany — ²University of Southampton, Southampton, United Kingdom — ³IBM Zürich Research Laboratory, Rüschlikon, Switzerland

The spin-transfer torque between itinerant electrons and the magnetization in a ferromagnet is of fundamental interest for the applied physics community. To investigate the spin-transfer torque powerful simulation tools are mandatory. For the comparability of different simulation tools it is important to develop standard problems that can be simulated by different simulation tools and allow an easy verification of the implementation. Previous standard problems do not include spin-transfer torque. We propose a micromagnetic standard problem, including the spin-transfer torque, that can be used for the validation and falsification of micromagnetic simulation tools. The work is based on the micromagnetic model extended by the spin-transfer torque in a continuously varying magnetization. The suitability of the proposed problem as a standard problem is proven by numerical results from four different finite-difference-method and finite-element-method based simulation tools.

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