Simplified Generation of the Input Models of Object Oriented Micromagnetic Framework (OOMMF)

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ABSTRACT

Object Oriented MicroMagnetic Framework (OOMMF) is a micromagnetic simulation tool. It takes a memory initialization file (MIF) as the input and outputs various forms of data such as data table, graph and magnetic configuration plots. It is accurate and fast compared to other existing tools such as MATLAB. Few experimentalists used it in the past, however, due to two main reasons. First, OOMMF requires a specific version of programming environment on the local computer which is difficult to be installed. Second, MIF file is very complicated to code and it also requires users to read a lengthy guidelines. Our solution to these problems is to first install OOMMF on nanoHUB, and second design a MIF generator, which is a separate tool can help users to design their models without understanding how to code a MIF file. By using the MIF generator, a user can enter the parameters of their micromagnetic models, such as dimensions and magnetic fields, and generates a corresponding MIF file which can be loaded into OOMMF as an input for further simulation. As a result, both the MIF generator and OOMMF are published onto nanoHUB so users can run all simulations on a web-based browser. Two different experiments were simulated to prove the success of this project. A cubic micromagnet was simulated in both local and nanoHUB OOMMF and the simulation results are nearly identical. Also, two cylindrical nanowires were modeled through the MIF generator and simulated in OOMMF. The simulation results correspond to the experimental results obtained before. Overall, OOMMF is improved by designing a separate tool which helps users to generator input files for OOMMF.

KEYWORDS

OOMMF, micromagnetic, MIF and nanoHUB