Biaxial nanomagnets as building block for balanced half-adders

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1 Introduction

Probably MuMax3 will be used. [1] An interesting source is [2].

2 Physics

2.1 Landau-Lifschitz-Gilbert equation

2.2 Energy contributions

2.2.1 Exchange energy

Tries to align neighboring spins: $E_{i,j} = -J\mathbf{S_i} \cdot \mathbf{S_j}$

2.2.2 Magnetostatic energy/Demagnetization energy

2.2.3 Zeeman energy

$E = -\mu_0 \mathbf{M} \cdot \mathbf{H_{ext}}$

Bibliography

[1] A. Vansteenkiste, J. Leliaert, M. Dvornik, M. Helsen, F. Garcia-Sanchez, and B. Van Waeyenberge, "The design and verification of Mumax3," *AIP Advances*, vol. 4, no. 10, p. 107133, 2014. [Online]. Available: http://doi.org/10.1063/1.4899186

[2] D. Carlton, "Nanomagnetic logic," Ph.D. dissertation, EECS Department, University of California, Berkeley, Feb 2012. [Online]. Available: http://www2.eecs.berkeley.edu/Pubs/TechRpts/2012/EECS-2012-22.html