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Investigation of cubic particles with uniaxial anisotropy using M^3-a Matlab based micromagnetic code[1] ANGELIQUE MONTGOMERY, University of Maryland Eastern Shore, CLAUDIA MEWES, TIM MEWES, University of Alabama — We have developed a Matlab based micromagnetic code (M^3) to simulate three dimensional magnetic structures. We find that the mathematical notation and the multidimensional capabilities of Matlab greatly simplify code development and maintenance compared to other programming languages. Here we report on the investigation of the magnetic states of cubic particles with a reduced size L and a uniaxial anisotropy of relative strength Q=K_u/K_d (K_u: uniaxial anisotropy, K_d: magnetostatic energy density) along one of the cube axis in zero field. As can be expected using estimates of the energy based on domain theory, we find single domain states for small L with a transition to a vortex state for small Q and to a two domain state for large Q. Increasing L further eventually leads to the formation of three and multidomain states. We have also investigated the influence of the boundary conditions for the 26 neighbor method on the resulting magnetic states.

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