1043-49-151 **Baisheng Yan*** (yan@math.msu.edu), A-215 Wells Hall, Michigan State University, East Lansing, MI 48824. *A duality method for micromagnetics.*

We present a new method for micromagnetics based on replacing the nonlocal total energy of magnetizations by a new local energy for divergence-free fields and then studying the dual Legendre functional of this new energy restricted on gradient fields. We establish a Fenchel-Moreau type duality principle relevant to these minimization problems. The dual functional may be written as a convex integral functional of gradients, and its minimization problem can be solved by standard minimization procedures in the calculus of variations. In this way, we obtain some new and general results for the study of micromagnetics. (Received August 25, 2008)