Open source implementation of different variants of Jiles-Atherton model of magnetic hysteresis loops

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Jiles-Atherton model is one of the most advanced and most popular model of magnetic hysteresis loop [1]. Since its introduction in 1984 this model was developed considering different physical phenomena and computational issues. As a result, cross-validation of the results of modelling performed by different authors became difficult.

To overcome this problem, open-source MATLAB/OCTAVE based implementation of Jiles-Atherton model is presented. Developed implementation covers isotropic model of magnetic hysteresis loops as well as uniaxial and cubic anisotropy. Moreover, the correction proposed by Venkataraman together with different approaches to derivative of the anhysteretic magnetization are considered.

Developed library is freely available to commercial and scientific use. As a result, it can be the base for further development of Jiles-Atherton model for better understanding of magnetization process as well as modelling the inductive components.

References:

[1] D. C. Jiles, D. L. Atherton, Journal of Magnetism Magnetic Materials 61 (1986) 48-60.