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An improved DAQ-based method for ferrite characterization

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Abstract— In this paper, we propose an improved version of the classical volt-amperometric measurement method for the characterization of magnetic hysteresis and losses in soft magnetic cores. Using an appropriate circuital solution for the automatic cancellation of the measurement offset and a synchronous data-acquisition-based scheme for both generation and acquisition of signals, we are able to implement a high performance and low error fully automatic test system. This reduces the testing time, while allowing the use of new segmentation algorithms for the study of both major and minor hysteresis loops and the extraction of all the desired properties. We tested the system on a ferrite core, reproducing results already known from the literature with a higher degree of accuracy and reliability, and propose a test to assess the limits of applicability of the method. Energetic magnetic behavior during the formation of asymmetric minor loops is shown and discussed throughout this paper.

Index Terms— Data acquisition (DAQ), electronic circuits, instrument amplifiers, magnetic hysteresis, metrology.

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