MagNet: An Open-Source Database for Data-Driven Magnetic Core Loss Modeling

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***Abstract*—This paper introduces an open-source database – *MagNet* – for data-driven magnetic core loss modeling. MagNet aims to support data-driven magnetics research by hosting a large amount of experimentally measured excitation waveform data for many materials across a variety of operating conditions. This database in its current state contains over 150,000 excitation waveforms for six ferrite materials - TDK{N27, N49, N87}, Ferroxcube{3C90, 3C94}, Fair-Rite{78} - in the 50 kHz to 500 kHz, 10 mT to 300 mT range for sinusoidal, triangle, and trapezoidal waveforms. This paper presents the purposes of building MagNet, introduces the data acquisition system and data**

TABLE I
NUMBER OF PARAMETERS USED BY CORE LOSS MODELS

Method	Core Loss (P_v)	#Param.
SE	$kf^{\alpha}\hat{B}^{\beta}$	3
iGSE	$\frac{1}{T}\int_0^T k_i \lvert\frac{dB}{dt}\rvert^{\alpha}(\Delta B)^{\beta-\alpha}dt$	3
i^{2}GSE	$\frac{1}{T}\int_0^T k_i \lvert\frac{dB}{dt}\rvert^{\alpha}(\Delta B)^{\beta-\alpha}dt + \Sigma_{l=1}^{n} Q_{rl}P_{rl}$	8
ML	Neural Network	$\gg$10