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Deep NN in acoustic emission classification and hysteresis analysis

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This contribution presents the results of the past year of our research, the main objective of which was to identify, implement, and compare deep learning methods for the recognition of acoustic emission signals. Two experiments were conducted to obtain relevant data for comparing these methods. Initially, five selected architectures designed to work
directly with 1D signals as input data are presented. These models are compared based on their performance in a classification task using the data from the experiments. Additionally, an adapted version of the best-performing Pooled Inception Time network is utilized in a regression task to predict continuous dependent variable. Subsequently, we focused on the problem of estimating the shape of the probability distribution on the Preisach-Mayergoyz space from resulting hysteresis curves. We employed the neural networks introduced in the first part to predict the shape of the distribution mixture.

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