

Experimental validation of valve solenoid numerical model

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Abstract: Computer Aided Engineering (CAE) is often used in modern design processes. In this method, a trustworthy model is developed and used for determination of the design behavior. The level of complexity of the model depends on the required precision on the one hand and available CPU time on the other. These are conflicting criteria and the compromise is to build a model of moderate complexity, which requires relatively low computational time. In any case, we need to verify the accuracy of the model and the best way to do so is to compare the obtained numerical data with experimental results. In this paper, the considered solenoid valve is of a fast reacting type, with a specified stroke length. Two different Finite Element Method (FEM) models of the valve solenoid are described – an axisymmetric model and a full 3D one. For the sake of models validation a valve mockup has been built. Then, the experimental static characteristics of the coil attractive force vs. the valve stroke for given current intensities are compared with simulation results in order to prove the accuracy and reliability of both developed models.

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