Model matematyczny, analiza numeryczna i doświadczalna układu pozycjonowania wykorzystującego silnik liniowy

Mgr. inż. Jakuba Gajka

Promotor: Prof. dr hab. inż. Jan Awrejcewicz
Promotor pomocniczy: Dr inż. Michał Ludwicki

The aim of this study was to create a mathematical model of a linear coreless motor system with linear guides, and then conducting its numerical simulation. Two models were developed (with the sine wave pattern of the magnetic induction of the guideway and the Jacobi theta functions). An experimental setup was also designed and built to identify the parameters found in the equations of motion and to verify the correctness of the assumptions made. The resistance forces were identified experimentally as the LuGre model was chosen as the closest to the experiment. Using the original simulation program, numerical calculations showing the reliability of the mathematical models developed in relation to experimental data were carried out. The dissertation showed that both models used have their advantages and disadvantages and can be used depending on the motor's operating conditions. The way of model building described in the work can be successfully used for other types of motors, including motors with a ferromagnetic core or asynchronous motors, with a shape other than linear, and even with a different distribution of the magnets.

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