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DYNAMIC CHARACTERISTIC ANALYSIS OF LINEAR DC MOTOR ACCORDING TO THE SHAPE OF MAGNETIZATION IN PM USING 3D TIME STEPPING EMCN METHOD

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High-speed response and high-efficiency of an LDM as direct drive actuators with depend not only on thrust but also impedance of the moving coil and the shape of magnetization in PM. Furthermore, in case that the magnetization in PM is not uniform, the force density includes more harmonic components than that of uniform case. So, the analysis of the density must consider the shape of the magnetization. In this paper, we developed a new 3D model for dynamic transient analysis of LDM by coupling of external circuit and motion equation using EMCNM. This method is capable of 3D modeling and analyzing the motor with faster computation time than conventional methods without the re-meshing. Also, the endring is modeled by conformal mapping to reduced modeling error. Fig. 1 shows spatial magnetic flux density distribution in the air gap. Comparing the developed method with experimental result with respect to the thrust versus electrical angle as shown in Fig.2.

