Three Parameters Optimization of Acting Force of DC Electromagnet

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***Abstract*— The paper proposes an optimized geometry for a DC electromagnet combining the experimental design (DOE) and FEM. The optimization problem takes into account three geometrical parameters (coil shape ratio, support thickness ratio and support height ratio) and consists in maximization of the acting force related to the largest air-gap, maintaining the global dimensions of electromagnet (external radius, height of carcass, height of plunger with support) and the cross-section of the coil. The method by zooms without computation of models was used to obtain a gain of 3.17% in acting force corresponding to the airgap of 41 mm. The numerical computation of electromagnetic force used the Maxwell Stress Tensor approach in FEMM software.**

***Keywords*— optimization; DOE; 2-D FEM**

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