

FUNDAMENTAL STUDY OF MAGNETICALLY LEVITATED CONTACT-FREE MICRO-BEARING FOR MEMS APPLICATIONS

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Abstract- In this paper, the authors introduced a new approach to realize a contact-free micro-bearing for MEMS (Micro-Electro-Mechanical-Systems) applications. In the proposed idea, the mechanism of magnetic repulsion by eddy current was employed. Numerical analysis and experimental research was performed. In the proposed structure having a ringed magnetic circuit having a circularly-arranged gap (gapped-core), the generated magnetic flux was concentrated with high density and showed precipitously gradient in the magnetic field and also showed a larger of repulsive force comparing to the general electromagnetic (iron-core). Advantage of the proposed method and its viability as a contact-free Micro-bearing was discussed.

Index terms: Micro-bearing, magnetic levitation, eddy-current, contact-free, MEMS