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## Dynamic characteristics of a fully HTS magnetic bearing under harmonic excitation

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The named fully superconducting magnetic bearing (SMB) consists of a rotor of high temperature superconducting (HTS) bulk of YBaCuO and a stator wind of HTS coated conductor tapes. The fully SMB has been developed a prototype and under operation in Japan. The dynamics of fully SMB under long term operation is vital to engineering applications, however, the experimental and theoretical studies on dynamic behaviors of fully SMB has not be reported. In previous work, the levitation properties of HTS bulk exposed to the high magnetic field, larger than 2 T, generated by HTS coils winded by HTS coated conductor tapes, were numerically investigated and discussed with the fishtail effect in levitation force prediction in high magnetic field. In this paper, a 2-dimensional(2-D) model of the fully SMB is introduced and coupled with the 2-D motion 2nd-order equations with respect to time, to simulate the dynamic behaviors in the vertical and lateral directions. The dynamic responses of a fully HTS SMB under harmonic excitation will be investigated, such as the displacements in time and frequency domains, phase trajectories, and motion trajectories. This work will provide an initial promotion of quantitative discussion in dynamic characteristics and principles for applications of fully SMB.

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