

The Application of High Speed and Optimal Control in Electromagnetic Bearing System Based on DSP

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ABSTRACT

Magnetic Bearings can be controlled actively and realized non-contact support. The controller played an important role in Magnetic Bearings. We adopt the TMS320VC33 DSP (Digital signal Processor) of TI Company to achieve the digital control. A high speed and optimal control strategy is researched for the electromagnetic bearings in this paper. The control method adopts the combination of the Bang-Bang control and PID control. Be compared with analog PID control, the high speed and optimal control system has the advantages of the flexibility of the control design, high speed and high accuracy and so on. Bang-Bang control makes it true that the magnetic bearings has strong ability of the anti-disturbance. The simulation result showed that the controller could meet the needs of quick and accurate performance. The experiments have been tested on the electromagnetic bearing test rig and the higher stiffness obtained by using the high speed and optimal control strategy.