

FPGA Based High Efficiency Transconductance Amplifier for AMB.

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A transconductance amplifier with digital control based on FPGA (Field Programmable Gate Array) is proposed in this paper. This amplifier is designed to drive active magnetic bearings directly using digital control signals coming from an external Digital Signal Processor (DSP). No analog DSP outputs are needed. The digital current loop control technique implemented on the FPGA provides large bandwidth and low power consumption, while synchronous bridge topology ensures high efficiency. Load current is digitized to feed the control loop without applying any traditional analog-to-digital converter. The DSP/FPGA based host system that controls the amplifier allows fast prototyping of the Active Magnetic Bearing (AMB) system, employing a modular configuration. The use of an FPGA goes by the trade-off between hardware speed and flexible remote system reconfiguration.