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Abstract
A study on speed control system of the electronic treadmill based on the TI TMS320LF2407 DSP is presented in this thesis, and systematic drive adopts the way of PMSM. First of all, a fully digital servo motion controller for controlling PMSM is developed in TMS320LF2407 DSP chip. That is, coordinate transformation, detection of quadrature encoder pulse (QEP), Proportion (P) controller, integration – proportion (IP) controller, fuzzy controller, SVPWM output of ac motor, are all performed by software in a TMS320LF2407 DSP chip. Current loop adopts proportion – integration (PI) controller. In order to improve the robustness of speed controller and understand the treadmill of appears characteristic in different control rules. Speed controller adopts three ways of proportion (P), integration – proportion (IP) and Fuzzy. In addition, an experimental system of structure - include controlling and shows the window (written by VB), the experiment board regard TI TMS320LF240X EVM as the core, servo motor driver, permanent magnetism synchronous motor (PMSM), treadmill machine platform, etc. The experiment include the treadmill unloaded responding of step command, the starting of treadmill loads, the running of treadmill real machine loads . According to the experimental result, in the control of the speed loop, fuzzy controller has better response and performance than IP controller and P controller.
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