A Fuzzy Scheduling Controller for the Computer Disk File Track-Following Servo

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Abstract

In this paper, a fuzzy tuning algorithm is developed for the computer disk drive track following servo system. A Zentek 3100 disk drive is modified, and a controller scheduling capability is added to the servo loop to compensate for the plant variations as the actuator is locked on to different tracks. The mathematical models for the actuator on a number of tracks chosen are experimentally identified. The H_∞ design technique is then employed to obtain a robust optimal controller for each operating point. A combined controller is then calculated using a fuzzy algorithm. The fuzzy algorithm is used to represent the complex relationship between the track number and the corresponding controller. It is shown that with the controller scheduling action, the closed-loop performance is improved for the actuator at every track positions.