

PI-Type Fuzzy Controllers for Mobile Satellite Antenna Control System  
Design with Tracking Loop Gain Parameter Variations

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Abstract

This research applied Proportion and Integration (PI) type fuzzy methods for mobile satellite antenna control system design. The detailed block diagram of a satellite antenna tracking system is very lousy; it is very difficult to obtain the key parameters for analyses and simulation. Thus a simplified model of antenna pitching or yawing control system is applied to speed up the design and obtain the key parameters. Firstly, the antenna tracking and the stabilization loops were designed according to the traditional bandwidth and phase margin requirements. However, the performances would be degraded if the tracking loop gain is reduced due to parameter variations. On the other hand a PI-type fuzzy controller was also applied for tracking loop design. It can be seen that the system performances obtained by the fuzzy controller were better for both lower and higher antenna tracking loop gains, and the tracking loop gain parameter variations effect can be reduced.

Keyword : Antenna tracking loop, stabilization loop, PI-type fuzzy controller, PI compensator.