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COMPARATIVE STUDY OF CLASSICAL AND FUZZY PID ATTITUDE CONTROL SYSTEM WITH  
EXTENDED KALMAN FILTER FEEDBACK FOR NANOSATELLITES.

**Abstract**

Active attitude control is a major part of any satellite mission. Fine pointing maneuvers like camera pointing for imaging, and antenna pointing for down-linking data are extremely important for mission success. Conventional PID Controllers in conjunction with Extended Kalman Filter as a sensor feedback have been actively used in the industry for fine pointing due to their robust and stable nature. Recently, fuzzy controllers have been observed to outperform classical controllers in certain non-linear systems. However, they are yet to be implemented on board a satellite. The paper covers a comparative study between the classical and the fuzzy PID controller for a nano-satellite system being developed by our university. The system of interest is a 3U (30cm x 10cm x 10cm) nano-satellite with magnetorquers and reaction wheels as actuators. A comparative study based on various performance parameters such as pointing time, size of code etc. is performed and documented. The paper concludes with finding the suitable controller for the given environment and discussing the scope of optimisation in the controller to give better results.