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Robust Control of a Furuta Pendulum

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Abstract

This paper designs robust controllers for a Furuta pendulum, and verifies the system performance and robustness by experiments. First, we derive the system's transfer functions, and design a standard H_∞ robust controller for balancing control. Because lower-order controllers are preferable for hardware implementation, we then apply fixed-order robust control techniques to simplify the controller structure. The effects of these controllers are experimentally compared. Finally, we designed some experiments to test the robustness of these controllers. From the results, the H_∞ fixed-order controller is shown to be effective.