Public Abstract
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The objective of this thesis is to create experimental models a hydraulic servo system using force control and then improve upon the performance of the models/system through feedback control design (linear transfer functions represent the models of the system). The hydraulic system (including the mechanical and electrical systems) is first constructed and tested. Experimental data based linear models of the system are found through input-output measurements. The models contain a right-half-plane zero; therefore, a bandwidth limitation is placed on the control design (i.e. the perofrmace of a given control system is limited). Three types of controllers (P, PID, and H-infinity) are designed specifically for the linear models. The closed-loop time domain and frequency domain performance of each control system is found and compared for the models and system. Uncertainties and performance weights are finally used in finding the nominal/robust stability and performance. H-infinity control is found to provide the system with the best combination of performance and stabiltiy.