

Linear Controller Establishment for Displacement-control Pump Switching System

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Displacement Controlled (DC) hydraulics system is booming recently due to its high efficiency and accurate controllability, while the surplus numbers of pumps restrains its further development. DC pump switch technique is a promising application to reduce the number of pumps as well as the cost products to promote DC hydraulics technique. It is necessary to support an innovative DC hydraulic pump switching system with a controller which would allow rapid and accurate estimation and adaptation for all the parameters, like pressures and velocities, in the system. Dynamics and Hydraulics characteristics have initially been investigated for a simplified DC pump switching system testing rig, which is the Joint Integrated Rotary Actuator. Based upon the results from the test rig, three different kinds of models - Simmechanics, Nonlinear and linear - have been established for validating the state space model, which will be used for linear controller establishment. Matlab and Simulink will be implemented for validating predicting data. After fully validating data, labview will be utilized to build up a simple controller and generally build up its complexity. The ideas and experience came up with in this project would be modified and implemented for other DC hydraulics system controller development.