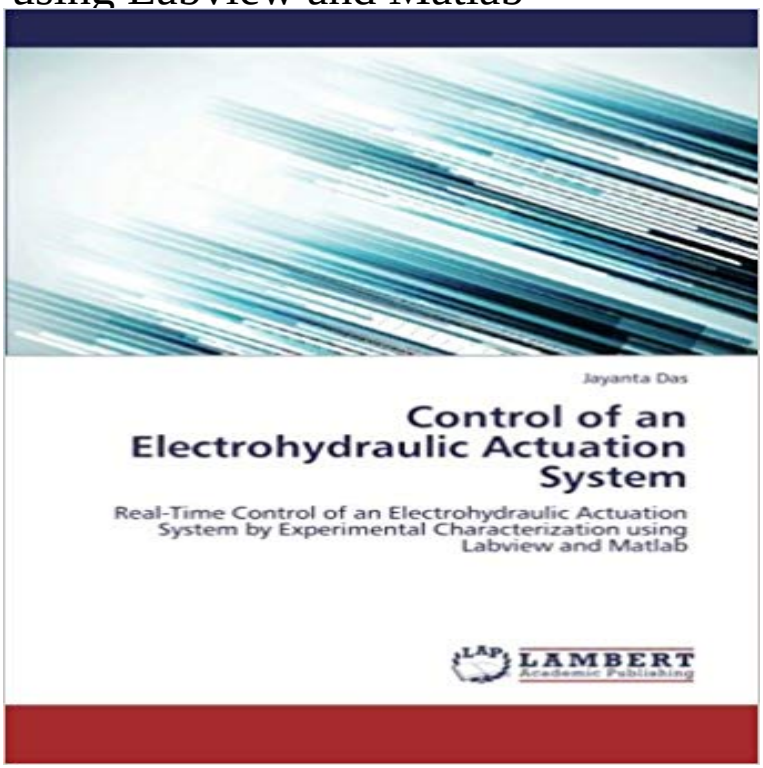
Control of an Electrohydraulic Actuation System: Real-Time Control of an Electrohydraulic Actuation System by Experimental Characterization using Labview and Matlab



Electrohydraulic systems have higher power-to-weight ratio and higher speed of response in comparison to electrical actuators. Advancement in the computational power and user-friendly re-embedding option of real-time control algorithm in Field-Programmable Gate-Array, or FPGA, architecture hold promise for the design and use of the more precise and robust nonlinear model-based controllers. Non-linear behavior of the system poses challenge to modeling and control of electro-hydraulic systems.The objective of the studies are nonlinear modeling through systematic experimental characterization of the different modules of an electrohydraulic system and their use for real-time control. The mathematical models used in overall plant are used to develop a close loop control model of the plant. An off-line nonlinear feedforward control with spring loading on the actuator piston beyond cushioning zone has been developed using these subsystem models by neglecting oil compressibility, valve dynamics and leakage.PID feedback has been used in real-time so as to take care of the unmodelled features and the modeling approximations.Simulation model developed controller is used in real-time.

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