



Development of High-Response Piezo-Servovalves for Improved Performance of Electrohydraulic Cylinder Drives

By Maxim Reichert

Shaker Verlag Aug 2010, 2010. Buch. Condition: Neu. Neuware - This book deals with the development and testing of high-response piezo-servovalves for improved performance of electrohydraulic cylinder drives. Performance improvement means in the context of this work an enhancement of reference and disturbance response of the drive in a closed-loop pressure and position control. Reference and disturbance responses determine the precision of the drive which influences product quality and motion accuracy in stationary and mobile applications. This thesis shows by means of linearised mathematical models that the drive performance can be significantly improved by high dynamics of the control valve. The increase in valve dynamics can be achieved by the use of piezoelectric actuators, which outmatch the response of common electromechanical valve actuators. Within the scope of this work two different novel high-response piezo-servovalves are prototyped. These are four-way directional flow control valves with linear spools. The book presents different steps of the design and development process of the valves such as conceptual design, calculation, dimensioning, manufacturing, design of internal valve control, testing according to the internationally standardized procedures and comparison to the performance of common servovalves. The achieved dynamics of the piezo-servovalves surpasses the response of the conventional valves....



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