



Sliding Mode Robot Controller Tuning Genetic Algorithms & Fuzzy Logic

By BASEL ELTHALATHINY

LAP Lambert Academic Publishing Aug 2016, 2016. Taschenbuch. Book Condition: Neu. 220x150x5 mm. Neuware - Sliding Mode Controllers possess robustness properties under parameter uncertainties. The ideally zero switching time of the controller output cannot be achieved in digital implementation. This causes a phenomenon called chattering - high frequency oscillations observed in systems state variables. Chattering also shows itself as high amplitude oscillatory behavior in the control signal. A chattering actuator output is not favorable for many plants, including robot manipulators driven by actuator torques. This problem is traditionally solved by smoothing the switching control output, deviating from the original mathematical foundations robustness. This motivates the exploration of automatic tuning approaches which consider chattering and performance simultaneously. This book proposes two SMC smoothing and parameter tuning methods with soft computing (SC) methodologies. The first method is based on Genetic Algorithms (GA). The second SMC parameter tuning method proposed employs a fuzzy logic system to enlarge the applicability range of the controller. The chattering measure and the sliding variable are used as the inputs of this system, which tunes the controller output mechanism. 88 pp. Englisch.



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