On the Design of Nonlinear Controllers for Euler-Lagrange Systems

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Abstract: The dynamics are studied of nonlinear feedback loops for the set point control of Euler-Lagrange (EL) systems. A class of controllers is considered that possess a linear dynamic component and several nonlinear amplifiers. Frequency domain conditions are presented for nonoscillatory behaviour of the closed loop, by which is meant that for increasing time all bounded solutions converge to one of the system's equilibrium states. The results constitute a systems theoretical basis for a new controller design method for EL systems.

Keywords: *Euler-Lagrange systems; nonlinear control; Liapunov's method; convergence criteria; stability regions.*