

ABSTRACT

A Dual Control System

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Conventional Feedback control systems may be regarded as having a single level of control, in that, control action results from the comparison of the process state with a desired state. Adaptive control systems improve on this by having an additional level of control which tunes the first level based on some performance criteria. It has been suggested in the literature that a third (supervisory) level would be advantageous in adaptive control strategies. Indeed the role and possible functions of such a level have been posed and investigated empirically.

One function of this supervisory level would be to coordinate the initial adaptation phase starting with a probing signal. In this thesis it is demonstrated by example that the use of a simple controller in this initial phase can provide acceptable regulation while maintaining the requisite conditions for good parameter identification.

The behaviour of this three level controller was investigated primarily via

simulations for a first order process subject to bounded disturbances and noise. But it was also applied to such a process. The results of these studies demonstrated the usefulness of the supervisory scheme in simultaneous process identification and control.