A Novel Internal Model Control Scheme For Adaptive Tracking Of Nonlinear Dynamic Plants

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Summary

Adaptive tracking of nonlinear dynamic plants is presently an active area of research. The design of on-line nonlinear controller for tracking of nonlinear plants has always been an inevitable computationally complex procedure. In this paper a novel method to facilitate controller design for output tracking of wide range of nonlinear plants based on a new control oriented model known as U-model is presented. The use of U-model alleviates the computational complexity of on-line nonlinear controller design that arises when using other modelling frame works such as NARMAX model. The U-model utilizes only past data for plant modelling and standard root solving algorithm for control law formulation. The control structure of the scheme contains two feedback loops. The innerloop, where inverse of the plant is developed based on adaptive U-model. Outer-loop, which is designed using linear control theory to improve tracking and disturbance rejection properties of the overall system. The effectiveness of the proposed scheme is illustrated by simulating a nonlinear plant and by real-time speed control of a laboratory scale DC motor