Reconfigurable Flight Control Design using a Robust Servo LQR and Radial Basis Function Neural Network

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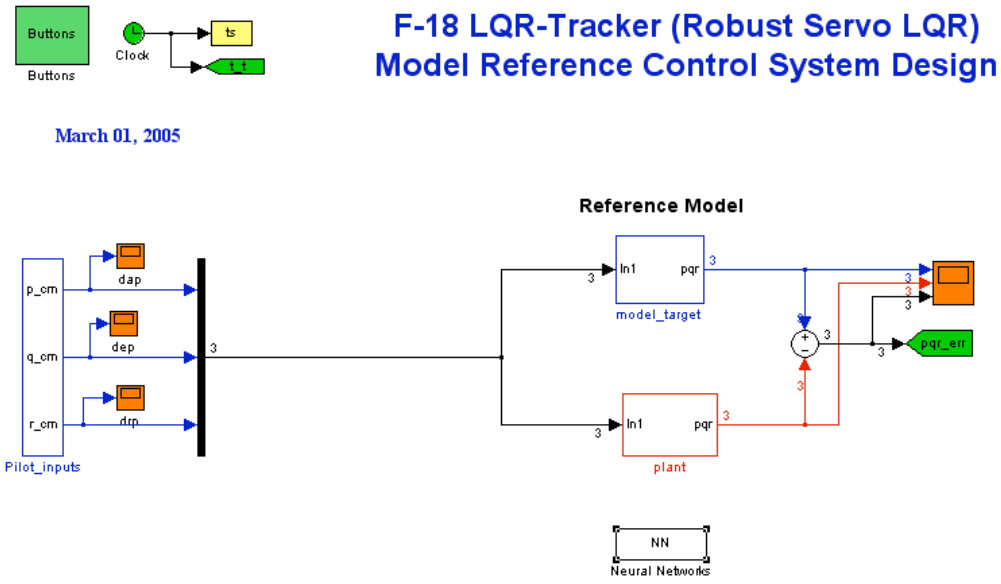
Abstract

In this presentation we apply a Radial Basis Function neural network based direct adaptive control system to a fighter aircraft model. For the purposes of this study, the existing control system is a Robust Servo LQR controller; which in turn is augmented with a direct adaptive model reference flight control system. The Robust Servo LQR system is designed to follow the rates of the "healthy" system (roll rate, pitch rate & yaw rate). The neural networks are added to adapt to unforeseen failures. The method presented is a direct adaptive control, therefore no plant parameter estimation is needed. The neural network modifies the feedfoward gains to minimize the controller errors.



Block Diagram of Model Reference Adaptive Controller