

Non-Iterative Direct Adaptive Control Margin Estimation

Adaptive online models can be used to estimate the proximity to a limiting flight condition for fly-by-wire aircraft. In this paper, a concurrent learning based adaptive framework is proposed to estimate allowable control travels directly without iterative estimations. Online models are established between the effective pilot input and the limiting aircraft state using optimal estimates of the adaptive weights. Generated models are used at the maneuvering steady state condition to find control margins. Effectiveness of the proposed algorithm is evaluated in simulations for load factor limit protection using a nonlinear fixed wing aircraft model.