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非线性动态逆神经元解耦飞行控制方法

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NONLINEAR INVERSION DYNAMIC NEUROCONTROL METHOD FOR FLIGHT DECOUPLING CONTROL PROBLEMS

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摘要

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摘要 提出一种非线性动态逆神经元控制系统设计方法, 并成功的将其应用于某战斗机非线性解耦控制问题。该方法的基本思想是采用神经网络建立非线性被控对象的动态逆模型, 将被控对象转化为伪线性系统, 并用现代控制系统综合设计方法对神经元伪线性系统进行闭环优化设计。给出的战斗机非线性动态逆神经元解耦飞行控制系统的仿真结果显示出人工神经网络作为非线性动态逆控制单元所具有的潜在能力

关键词: 飞行控制 非线性 神经元控制

Abstract: A novel nonlinear inversion dynamic neurocontrol method is proposed, which is successfully applied to a fighter nonlinear decoupling control problem. The method abolishes the conventional design way that directly gets the nonlinear inversion dynamic neurocontrol law by training the neurocontroller. The basic idea of the method is that the controlled system should be configured into a pseudo linear system with neural networks as nonlinear inversion dynamic compensators, and then, by means of modern control system synthesis methods such as linear quadratic regulator, the pseudo linear system should be configured into a loop closed system with the ideal system performance. The simulation results of a fighter nonlinear inversion dynamic decoupling neurocontrol system show the potential of this neural networks as a nonlinear inversion dynamic controller.

Keywords: flight control nonlinear neurons-control

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