

Newton-Raphson Based Adaptive Inverse Control Scheme For Tracking Of Nonlinear Dynamic Plants

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Summary

Adaptive tracking of nonlinear dynamic plants is an essential element of many control applications. The main difficulty felt in establishing the tracking of nonlinear dynamic plants is the computational complexity in controller design. This paper presents novel technique for adaptive tracking of a class of nonlinear dynamic plants based on a new control oriented model known as U-model. The use of U-model alleviates the computational complexity of the nonlinear controller design that occurs when using other modelling frame works such as NARMAX model. The U-model is utilized to design an adaptive inverse controller by using a simple root-solving algorithm of Newton-Raphson. The synergy of U-model with AIC structure has provided an effective and straight forward method for adaptive tracking of nonlinear plants. The effectiveness of the proposed technique is justified by simulating two nonlinear plants and speed control of a laboratory scale DC motor in real-time.

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