

Taylor polynomial Approximation and Adaptive Passivity-Based Control Applied to the Level Regulation of a Conical Tank

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Abstract

The techniques of Taylor polynomial approximation (TPA) and adaptive passivity-based controller (APBC) are combined in this study and applied to the level regulation of a conical tank. The design and comparative experimental results with a classical PI controller are presented. After combining these two approaches a robust adaptive controller named TPA-APBC, which is simpler than the classical APBC and PI controller, is obtained. This new TPA-APBC preserves the stability of the overall system after assuming that the nonlinear system is unknown and that it can be suitably represented by a first-order linear model with unknown parameters.

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