

Control of Chaos in a Convective Loop System

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Abstract: A convective loop is a system in which a fluid circulates freely inside a closed circular pipe. The circulating fluid works as a transport media of heat from a source to a sink. First order lumped parameter modelling of this system leads to a set of nonlinear ordinary differential equations. Depending on heating rate this system can show chaotic behavior. In this paper, the performance of nonlinear model predictive control is compared with other conventional nonlinear control law and it is found that although a simple linear or, nonlinear controller may stabilize the system, nonlinear model predictive controller outperforms other controllers.

Keywords: *Chaos; Lyapunov stability; nonlinear model predictive control.*

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