Abstract

Model predictive control based direct neural controllers represent another class of computer application in the field of non-linear controls. These controllers can also be made adaptive such that the adaptation mechanism attempts to adjust a parameterized nonlinear controller to approximate an ideal controller. Various approximators such as linear mappings, polynomials, fuzzy systems, or neural networks can be used as parameterized nonlinear controller. In this paper, we proposed a model predictive control based neural network controller to control the liquid level in a surge tank, with respect to the reference input. The neural controller works on the normalized gradient-based approximator parameter update law used for a class of nonlinear discrete-time systems in direct cases. In our proposed design, the reduction in error is reached upon between the ideal and the actual controller and the direct adaptive control scheme is tested for performance via a simple surge tank example. The proposed controller algorithm performs well and can be physically implemented.
Design of Model Predictive Control based Direct Neural Controller for Surge Tank Application

Physics, New York.


Index Terms

Computer Science Control Systems

Keywords

Model predictive control Direct neural control Non linear systems