

Robust neural network control system design for linear ultrasonic motor

林志民, 冷金緒, 許駿飛, 陳邱雄

Electrical Engineering

Engineering

fei@chu.edu.tw

Abstract

Linear ultrasonic motor (LUSM) has much merit, such as high precision, fast control dynamics and large driving force, etc.; however, the dynamic characteristic of LUSM is nonlinear and the precise dynamic model of LUSM is difficult to obtain. To tackle this problem, this study presents a robust neural network control (RNNC) system for LUSM to track a reference trajectory with robust tracking performance. The developed RNNC system is composed of a neural network controller and a robust controller. The neural network controller is the principal controller used to mimic an ideal controller and the robust controller is adopted to achieve robust tracking performance. The developed RNNC system is then applied to control an LUSM. Experimental results show that the developed RNNC system can achieve favorable tracking performance with unknown of LUSM model.

Keyword : Linear ultrasonic motor, Neural network, Robust control