The Iterative Learning Control of Pneumatic X-Y Table Control System

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ABSTRACT

The iterative learning control (ILC) learns the unknown information from repeated control operations. The tracking error from previous stages is used as the correction factor for the next control action. Therefore, the ILC controller can make the system tracking error converge to a small region within the limited numbers of iterations. In this paper, a proportional-valve controlled pneumatic X-Y table system is built to perform position tracking control experiments. The pneumatic system is subjected to external loads and to the parameter changes during the control. ILC controllers are implemented in the experiments to show their ability to reject disturbances. The P and PD-typed updating laws with delay parameters are used respectively for the repetitive trajectory tracking control of X-Y table. Pre-saved control signals for different types of disturbances are also used compare control performances. Experimental results show that under the disturbances the PD-typed ILC controller is superior to the P-typed one and can effectively control the system to track the given circular trajectory.

Keywords : Proportional valve, Pneumatic system, Iterative Learning Control, Two-dimensional system, Disturbance

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