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Abstract
This work studies how to servo-control a pneumatic 3-DOF motion platform. The motion platform consists if two rigid bodies connected by tree pneumatic pistons. The servomechanism is implemented by using tree proportion valves with a feedback Neural-Fuzzy controller. The Neural-Fuzzy controller has the ability of self-learning and the advantage of without mathematics models for the pneumatic pistons and the position valves. Several self-learning methods, such as back-propagation, counter-propagation, and quick-propagation, have been discussed in literatures. In the study, the back-propagation is adopted as the learning method.

For estimating the performances of the Neural-Fuzzy controller, two different types of controllers, PID and Fuzzy controllers, are also presented. Experimental results show that the Neural-Fuzzy controllers is superior to PID and Fuzzy controller. For the experiment of step response, the Neural-Fuzzy controller has less rise time and steady state than PID and Fuzzy controllers. For the experiment of position tracking a sine wave, the Neural-Fuzzy controller has less delay time and steady state error than PID and Fuzzy controllers.
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