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Abstract
In this research, the Cerebellar Model Articulation Controller (CMAC) has been applied to precision motion control system to compensate the position error resulted from the friction and backlash of the driving mechanism.
First, conventional PID control algorithm is utilized as a controller for the motion control system. And a DSP motion control card and a single-axis servo platform are used to implement the experimental work. It is found that PID control is not capable of dealing with friction and backlash of the servo platform within the required accuracy.
A learning controller based on the CMAC neural network is added to the PID controller in parallel for compensating the position accuracies caused by friction and backlash. And it is shown to be very effective in dealing with the problems of friction and backlash present in the servo platform.
The CMAC control algorithm is essentially a table look up algorithm, so the reduction in memory requirements is very important. A data shifting and mask of data compression has been developed to reduce the total memory numbers used in the CMAC control algorithm.
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