

Intelligent Scanning Probe Microscope System Design

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Abstract

This research applied both the traditional PI (Proportion and Integration) compensator and the neural-fuzzy control methods for a Scanning Probe Microscope (SPM) system design. In addition, the actuator hysteresis effect was taken into consideration. It can be seen that the system performances in input command tracking capability as well as the linearity obtained by the neural-fuzzy controller were much better, especially in eliminating the actuator hysteresis effect. This method was not proposed before, and the improvement has been verified by MATLAB simulation as well as practical implementation of a surface profiler.

Keyword : Scanning Probe Microscope, Force Actuator, Hysteresis Effect, Neural-Fuzzy Control