

## **Design and Comparison of Control Strategies for a PZT Stage**

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### **Abstract**

This paper applies three control methods to a nano-positioning PZT stage, and discusses the advantages of the designed controllers based on experimental results. PZT is frequently used for precision positioning; however, its nonlinear characteristics might degrade system performance. Therefore, we need to apply advanced control methods to improve its performance. We first derive the stage transfer functions by experiments, and then apply three control methodologies: PID control, LQ control, and robust control for precision positioning. The controllers are implemented for experimental verification. Based on the results, the designed controllers are deemed effective in achieving precision control. In addition, the robust controller is shown to reach better performance than the others, in terms of reaching smaller errors and coping with system uncertainties and disturbances.