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State Feedback Control for Adjusting the Dynamic Behavior of a Piezoactuated Bimorph Atomic Force Microscopy Probe

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We adjust the transient dynamics of a piezo-actuated bimorph Atomic Force Microscopy (AFM) probe using a state feedback controller. This approach enables us to adjust the quality factor and the resonance frequency of the probe simultaneously. First, we first investigate the effect of feedback gains on dynamic response of the probe and then show that the time constant of the probe can be reduced by reducing its quality factor and/or increasing its resonance frequency to reduce the scan error in tapping mode AFM.

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