Novel Multi Driving Mode Piezomotor System in Control Perspective

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Since the invention of ultrasonic motor, it has gain name as accurate, fast, and powerful device for precision actuation. However when we move to nanoscale actuation, its accuracy is not yet comparable with piezostack based system. In this paper, we discuss the realization and test of multimode piezomotor which combine both fast movement capability of ultrasonic motor (up to more than 200mm/s) and nanoscale fine positioning capability. To support this actuator, a smart multimode algorithm has been specifically designed to combine the operating modes. This algorithm is then tested on a linear multimode piezomotor stage setup. To test the performance of the complete system, experimental tests in form of trajectory tracking were conducted. The experimental results reveal that this motor has shown promising characteristics, suitable for future precision technology actuator. This novel device is an attractive substitute for hybrid actuators, especially where a simple and compact dimension is required.