

Structural-parametric model of electro-elastic actuator for manipulators in nanotechnology

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For nanotechnology, nanobiology, power engineering, microelectronics, astronomy for large compound telescopes, antennas satellite telescopes and adaptive optics equipment is promising for use nano- and micromanipulators with electromechanical actuator based on electro elasticity (piezo effect). Piezo actuator – piezo mechanical device intended for actuation of mechanisms, systems or management based on the piezo effect, converts electrical signals into mechanical movement or force. By solving the wave equation using the Laplace transform and taking the equation of the piezo effect, the boundary conditions on loaded faces of piezo actuator, the strains along the coordinate axes, it is possible to construct its structural parametric model. Decision wave equation, structural-parametric model, transfer functions of electro elastic actuator are obtained. Effects of geometric and physical parameters of the electro elastic actuator and external load on its dynamic characteristics are determined. For calculation of the nano- and micromanipulators the generalized parametric structural schematic diagram Figure 1 and the transfer functions of the electro elastic actuator are obtained. Static and dynamic characteristics of piezo actuator are determined. The generalized structural-parametric model

of the electro elastic actuator provides the determination of its transfer functions and calculation of its static and dynamic characteristics. The parametric structural schematic diagrams, transfer functions piezo actuator for transverse, longitudinal, shift piezo effects are determined from the structural-parametric model of the piezo actuator.

Biography

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