# Modeling and Simulation of a Torsion Actuator Made of Nylon Filament

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**Abstract:** The actuator of the angle of rotation or torque is presented that consists of two identical prestressed polymer springs of negative thermal expansion coefficient and a perfectly rigid angled beam in the shape of an inverted letter T. A mathematical-physical model for thermoelastic linear and nonlinear analysis of the torsional actuator is compiled, the result of which are the values of the action angle of rotation and torque of the actuator. The action is achieved by heating the polymer springs with a negative thermal expansion. The results of semianalytical models that can be used for automatic actuator control were verified by numerical analysis using the finite element method. The proposed torsion actuator shows a relevant action already at low warming of the nylon springs.