

Title MODEL AND APPROACHES FOR TENSION OF PARALLEL STRUCTURES WITH ELASTIC JOINTS FOR MICRO AND NANO MANIPULATORS

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Abstract: In this paper piezo actuated micromanipulators are considered with serial-parallel structure including elastic joints. Such structure allows a preliminary tension of the mechanical system in order to eliminate backlashes and to improve the performance of the piezo-actuators. A kinematics model of a serial-parallel structure for local micro manipulators is build here. A pseudo rigid body approach is used, where elastic joints are modelled as revolute joints. A stiffness model is created to estimate the general stiffness of the manipulator by means of reduction the stiffness of all elastic joints. Two approaches are presented here for preliminary tension of parallel manipulator structure: - deflection from the initial manipulator state by introducing of a driving joints motion during the assembly; - preliminary tensioning of the separate elastic joints. The two approaches considered are experimented on the manipulator for cell injection. The values of the mechanical parameters obtained by preliminary tension of the manipulator are pointed out.