Micro-manipulator design based on selectively actuated flexure parallel mechanisms

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Abstract: The concept of Selective Actuation (SA) is introduced in Flexure parallel mechanism (FPM) design. A selectively actuation FPM has decoupled motion mechanical structure as well as a modularly mounted 1-DOF actuator for each motion axis of the FPM. The kinematic structure of SA-FPM is obtained based on the diagonal form of the manipulator Jacobian and screw-based synthesis approach. The flexure structure of SA-FPM is designed based on the result of the synthesis process. The designs of a 3-DOF translational SA-FPM and a 6-DOF spatial SA-FPM are illustrated based on the proposed approach. Prototype of the 3-DOF SA-FPM is constructed. Experiment conducted on the prototype confirmed the motion requirement and performance set by the SA-FPM. © 2006 IEEE.

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