

Preliminary Study on Analysis of Pinching Motion Actuated by Electro-Active Polymers

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Abstract : Hand exoskeletons have been developed in order to assist daily activities for disabled and elder people. A figure exoskeleton was developed using ionic polymer metal composite (IPMC) actuators, and the performance of it was evaluated in this study. In order to study dynamic performance of a finger dummy performing pinching motion, force generating characteristics of an IPMC actuator and pinching motion of a thumb and index finger dummy actuated by IPMC actuators were analyzed. The blocking force of 1.54 N was achieved under 4 V of DC. A thumb and index finger dummy, which has one degree of freedom at the proximal joint of each figure, was manufactured by a three dimensional rapid prototyping. Each figure was actuated by an IPMC actuator, and the maximum fingertip force was 1.18 N. Pinching motion of a dummy was analyzed by two video cameras in vertical top and horizontal left end view planes. A figure dummy powered by IPMC actuators could perform flexion and extension motion of an index figure and a thumb.

Keywords : finger exoskeleton, ionic polymer metal composite, flexion and extension, motion analysis

Conference Title : ICME 2014 : International Conference on Mechanical Engineering

Conference Location : London, United Kingdom

Conference Dates : May 26-27, 2014