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(54) **HIGH PERFORMANCE DIFFERENTIAL ACTUATOR FOR ROBOTIC INTERACTION TASKS**

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(57) **ABSTRACT**

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The mechanical differential actuator according to the present invention comprises a mechanical differential having three mechanical ports. A first transducer with a low impedance is coupled to a first port, a second transducer with a high impedance is coupled to a second port, and the mechanical load is coupled to the third port. The mechanical differential actuator enables controlling a force and a speed at a load coupled thereto through a known relation between the force and the speed. Moreover, the mechanical differential actuator presents a compact structure enabling the transfer of a large force relative to its volume.

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