

A Study on the Small Biped Soft Robot with Two Insect-Like Nails

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Abstract : This paper presented a study on the development and control of a small biped soft robot using shape memory alloys (SMAs). Author proposed a flexible flat plate (FFP) actuators consisting of a thin polyethylene plate and SMAs. This actuator has a nail like an insect. This robot moves from the front to back and from left to right using two nails. The walking robot has two degrees of freedom and is controlled by switching the ON-OFF current signals to the SMA based FFPs. The resulting small biped soft robot weighs a mere 4.7 g (with a height of 67 mm). The small robot realizes biped walking by transferring the elastic potential energy (generated by deflections of the SMA based FFPs) to kinematic energy. Experimental results demonstrated the viability and utility of the small biped soft robot with the proposed SMA-based FFPs and the control strategy to achieve walking behavior.

Keywords : biped soft robot with nails, flexible flat plate (FFP) actuators, ON-OFF control strategy, shape memory alloys (SMA)

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