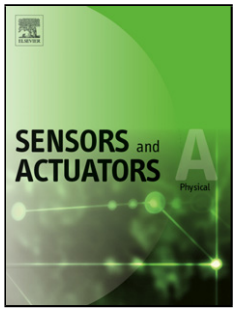

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Programmable design of soft pneu-net actuators with oblique chambers can generate coupled bending and twisting motions

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Highlights

- A pneu-net actuator with coupled bending and twisting motion is designed.
- The motion of the actuator can be programmable by adjusting the chamber angle.
- Both the FEA and experimental results are presented to verify the development.
- The actuator can dexterously grasp different objects with various sizes or shapes.

Abstract

Soft pneumatic network (pneu-net) actuators are widely employed for achieving sophisticated motions. However, to produce bending and twisting simultaneously in a single pneu-net actuator is challenging. In this paper we present a programmable design to enable pneu-net actuators to achieve such complex motions. This achievement is mainly owing to tuning a structure parameter, the chamber angle. Through finite element analysis and experimental verification, variation trends of bending and twisting motions with respect to the chamber angle are investigated. Additionally, deformation characteristics of actuators are

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