A New Approach to Solve Inverse Kinematics of a Planar Flexible Continuum Robot

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Abstract : Research on the modeling of continuum robots, focused on ways to constrain the geometric models, while maintaining maximum specificities and mechanical properties of the robot. In this paper we propose a new numerical solution for solving the inverse geometric model of a planar flexible continuum robot, we assuming that each section is curved in an arc of a circle, while having the central axis of the inextensible structure. The inverse geometric model for one section is calculated geometrically, whereas the extreme points, of each section, used in calculating the inverse geometric model for multi-section is calculated numerically using a particle swarm optimization (PSO) method. Simulation examples of this method are carried to validate the proposed approach.