عنوان مقاله:

Stability analysis and study of snap-through in planar tendon driven continuum robots

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خلاصه مقاله:

Continuum robots, due to their interesting applications, are becoming a rich and wide opportunity in robotic researches. Due to their flexible structure many studies have been performed to describe the kinematics and dynamics of these robots. . However, about the stability of continuum robots, especially the phenomenon of snap-thorough, more investigation is required. For a continuum robot, under a specific loading condition, there might be several possible equilibrium states. As the loading condition changes, the equilibrium state of the robot will change gradually, until the robot reaches the boundary of stability region. In this condition, robot moves uncontrollably from the unstable equilibrium configuration to the stable one. This, phenomena is called snap-through or buckling. Considering theapplications of continuum robots especially in minimal invasive surgery, predicting the occurrence and prevention of this event would be very important. This paper presents a discrete model for the kinematic and dynamic analysis of planar tendon driven continuumrobots. Then, the proposed model, will be used for studying of the stability of the planar tendon driven continuum robots and also, the snap-through is shown by simulating in these robots. The results of current study can be extended to other types of continuum robots

کلمات کلیدی:

energy method; modeling; stiffness matrix; eigenvalue

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