عنوان مقاله:

An Optimized Single Motor ۱ DOF Tendon-Based Transmission

محل انتشار:

فصلنامه نوین علم و مهندسی, دوره 1, شماره 3 (سال: 1399)

تعداد صفحات اصل مقاله: 7

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خلاصه مقاله:

Tendon based transmission is an efficientmethod for force and motion transference. Not only tendondrivenmechanisms provide dexterity and manipulability invarious applications, but also they keep the structure of themechanism light and the design delicate. Although tendondriven mechanisms are effective in driving systems withvarious degrees of freedom, they require either simultaneouscontrol of parallel tendons which could be challenging orutilizing passive tendons that decreases the control over themechanism. This paper presents a novel design for driving aplanar ۱ DOF joint by a single actuator. The mechanismbenefits from a compound non-circular pulley whichlinearizes the non-linear relationship between the pulley andjoint angle. The pulley enables the mechanism to operatewithout any controller while keeping all the tendons activewhich distinguishes it from the previous designs. Thealgorithm to derive the profile of the pulley is explained andthe mechanism parameters are optimized to minimize thetraction in the tendons and also to improve the precision ofthe mechanism. The pulley and a prototype of the mechanismhave been synthesized in order to prove the authenticity of thedesign and to compare the test result to the algorithmoutcome.

کلمات کلیدی:

Tendon; Motion transference; Single motor ۱ DOF; Pulley.