

Design of Reconfigurable Supernumerary Robotic Limb Based on Differential Actuated Joints

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Abstract : This paper presents a wearable reconfigurable supernumerary robotic limb with differential actuated joints, which is lightweight, compact and comfortable for the wearers. Compared to the existing supernumerary robotic limbs which mostly adopted series structure with large movement space but poor carrying capacity, a prototype with the series-parallel configuration to better adapt to different task requirements has been developed in this design. To achieve a compact structure, two kinds of cable-driven mechanical structures based on guide pulleys and differential actuated joints were designed. Moreover, two different tension devices were also designed to ensure the reliability and accuracy of the cable-driven transmission. The proposed device also employed self-designed bearings which greatly simplified the structure and reduced the cost.

Keywords : cable-driven, differential actuated joints, reconfigurable, supernumerary robotic limb

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