

Design and kinematic analysis of parallel robot for ankle rehabilitation

Abstract

Ankle injury is one of the most common injuries in sports or domestic related accidents. This injury can usually be treated via a number of rehabilitation exercises. However, currently rehabilitation of ankle injury directly depends of physiotherapy session administered by experts; which is tedious and expensive in nature. In this paper, we proposed a concept based on parallel mechanism to assist patients undergoing ankle rehabilitation procedures. This is due to a number of advantages of parallel mechanism as compared to serial mechanism higher payload-to-weight ratio, structure rigidity, accuracy and relatively simple solution. We reported our design process; including the concept generation and selection according to a number of relevant design parameters. After which, followed by embodiment design involving kinematic analysis of the proposed mechanism. The findings, in terms of conceptual design and kinematic analysis should be able to provide an insight for ankle rehabilitation based on suitable parallel mechanism.

Keywords; Ankle rehabilitation, Inverse kinematics, Parallel robot, Pugh method