

Two-wheeled wheelchair stabilization using interval type-2 fuzzy logic controller

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ABSTRACT

In this paper, an Interval Type-2 Fuzzy Logic Control (IT2FLC) is proposed to control a two-wheeled wheelchair system which mimics double-links inverted pendulum and known as highly nonlinear, unstable and complex system. The control structures of the two-wheeled wheelchair is based on IT2FLC for balancing and maintaining stability of two-wheeled wheelchair system in the upright position. This paper is aimed to develop a 3-Dimensional (3D) model of two-wheeled wheelchair using a SimWise 4D (SW4D) software, which replace a complex mathematical representation that is obtained using long equation and derivation. The movement of the system is visualized using the SW4D as it is integrated with Matlab Simulink. Simulation results show that the IT2FLC give a good performance in term of tilt angle at zero degree in the upright position.

KEYWORDS:

Double-link inverted pendulum; Interval type-2 fuzzy logic control; Two-wheeled wheelchair