

# THE INVESTIGATION ON DYNAMIC BEHAVIOR OF ELECTRIC POWERED WHEELCHAIR DURING THE OBSTACLE AVOIDANCE

I.M. Sollehudin 1 , P.M. Heerwan 1 2\*

1 Faculty of Mechanical and Manufacturing Engineering, Universiti Malaysia Pahang,  
26600 Pekan, Pahang, Malaysia

\*Email: [mheerwan@ump.edu.my](mailto:mheerwan@ump.edu.my)

2 Automotive Engineering Centre, Universiti Malaysia Pahang,  
26600 Pekan, Pahang, Malaysia

## **Abstract:**

The increment of the People with Disabilities (PWDs) keep increasing in each year and an urge of assisting these PWDs is demanding. Commercial manual wheelchair eases the mobility of the PWDs but there is side effect for the manual wheelchair users that is pain on shoulder area due to extensive daily propulsion of manual wheelchair for mobility. Therefore, this paper presents an approach towards the autonomous wheelchair whereas concerning the PWDs that have disabilities from upper to lower limbs. These paper investigates the dynamic behaviour of the autonomous wheelchair during the obstacle avoidance. The experiment conducted on the Electric Power Wheelchair (EPW) with two different speed and as a first step before implementing self-navigation system in EPW. The objective of this study is to determine the behaviour of the autonomous wheelchair by using the intervention of human input on EPW. The EPW user will manoeuvre the EPW via joystick with several speed. This study focused on the changes in speed of both left and right tires and yaw angle during the obstacle avoidance. The data will be used as a reference for the development of an autonomous wheelchair during the obstacle avoidance. The data that manoeuvred manually also serve as the human-machine relationship whereas the data will be interpreted into the control systems that will be developed for the autonomous wheelchair. Based on the results, the experience does not affect the manoeuvring skill for both male and female students. Based on the yaw rate, the manoeuvring skills of male and female students could be defined which are 57.9% and 42.1% respectively.

**Keywords:** Electric Powered Wheelchair; Obstacle Avoidance; Dynamic Behaviour; Human-machine Relationship; Tires Velocity

## **ACKNOWLEDGMENT**

The authors would like to thank Universiti Malaysia Pahang ([www.ump.edu.my](http://www.ump.edu.my)) for the financial support through the UMP internal grant RDU190321.