

**Modifikasi Kecepatan Sepeda Simulator VRAC Dengan Sistem Kontrol Tertutup Dalam Mengakomodasi Kemampuan Motorik Pada Terapi Fisik Pasca Stroke**

*VRAC Simulator Bike Speed Modification With Closed-Loop Control In Accommodating Motor Ability In Physical Therapy Post Stroke*

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***ABSTRACT***

The objective of this study is to develop a modified VRAC that allows post-stroke patients to pedal according to their ability despite the differences in functional ability. The VRAC is developed using a closed-loop fuzzy logic control system to automatically load the pedal according to the user's stroke ability from a certain condition to generate a pedal rhythm that matches the set point established in the exercise. By utilizing velocity parameters and velocity error changes, the system was able to manipulate the PWM values to control the direction of rotation and motor speed in assisting in determining the load level. In the first phase of the intensive testing, an average speed of 60.44 RPM was obtained for the first patient and 57.44 RPM for the second patient with set points of 63.64-53.04 and 59.51-49.59, respectively. In the second phase of intensive testing, the first patient achieved an average speed of 57.60 RPM, while the second patient achieved an average speed of 55.46 RPM with set points of 68.43-57.02 and 56.1-46.75, respectively. With this in mind, the development of VRAC is expected to assist in the rehabilitation of post-stroke patients in optimizing motor and cardiorespiratory movements during VRAC exercises.

**Keywords :** modification VRAC, fuzzy logic, closed-loop control.