

ABSTRACT

Exoskeleton robot or robot exoskeleton can be called is an elec Exoskeleton robot or robot exoskeleton can be called is an electromechanical device. In this case, the robot is used as a rehabilitation aid. Assistive devices are needed in the rehabilitation process, so that patients can practice at home independently. Exoskeleton robots can be used as a tool for rehabilitation patients to carry out consistent rehabilitation and get the desired results.

In this study, the exoskeleton robot developed was aimed at rehabilitating the upper limbs of post-stroke patients. This device supports the patient's arm and provides automatic rehabilitation movements. The system uses the inverse kinematic control method to run the device automatically. This device moves with two types of actuators, namely stepper motors and servo motors. The actuator was chosen to provide good torque performance in supporting the load. This device can move the arm because it has 2 degrees of freedom or 2 DOF (degree of freedom).

The results of the research from the exoskeleton robot, the authors succeeded in making an upper limb rehabilitation device with a PID control system using the trial and error method. Feedback or feedback used is MPU6050. The accuracy of the MPU6050 is 99.5%. Due to the good level of feedback accuracy, the positioning test can reach 90% in Cartesian coordinates (55,15), (55,-15), and (35,15). The mechanical material of this robot is made of sturdy materials, namely aluminum and wood which is attached to a wooden chair. So that the device is able to support the weight of the arm up to 1.5 Kg.

Keywords: *exoskeleton, inverse kinematics, electromechanical, servo, stepper, 2 DOF, torque and PID.*