ABSTRACT

DC TO DC POWER CONVERTER AS DC MOTOR DRIVER WITH PI CASCADE SPEED CONTROL

DC motor is an electrical component that can produce mechanical motion using electromagnetic principle. DC motor consists of magnets and coils that when electrified will produce an electromagnetic field that causes the DC motor to start rotating. DC motors commonly used as actuators in a system with a link called a driver. On a system driver that ususally used is H-Bridge circuit.

On the other side the use of H-Bridge also has lack such as the output is still in PWM. If PWM signal used to adjust the rotation of a DC motor, it's result a sudden change of torque on the DC motor. In the long run, it can reduced the lifetime of a DC motor. Therefore, we need the driver that controls the output in DC voltage. In this final project author will make a driver using DC to DC Power Converter type Buck Converter. In addition, the control system used to control the rotational speed from the DC motor uses a cascade PI control system.

The result of this final project is a prototype of DC power converter with 24 V input and output with range 0V-12 V as DC motor driver. The control applied to this system is the PI cascade control system with each parameters 1.113 primary kp, 0.011 primary ki, 1.37 secondary kp and 0.09 secondary ki. This system is capable to controlling the rotation of a DC motor with maximum rotation up to 23 RPS. The speed control system has accuracy ± 0.664644444 RPS per 5 PWM change.

Keywords : ***DC motor, DC to DC Power Converter, DC Motor Driver, dc motor speed control system.***