

ABSTRACT

DESIGN OF PRACTICE INSTRUMENT STEP-UP CHOPPER AND STEP-DOWN CHOPPER IN ELECTRIC ENERGY CONVERSION LABORATORY

By :

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Chopper is a instrument that serves to convert the fixed-voltage DC source into a variable-voltage DC source. Chopper output voltage can be larger or smaller than its input voltage. To know the working principle of chopper then is made a instrument practice step-up chopper and step-down chopper. With made this practice instrument so that can help the implementation of power electronics practice in electric energy conversion laboratory.

Chopper uses microcontroller ATmega8535 type as the main controller that is functions to produce a PWM which is used to control the switching of the transistor. Switching transistor is used in three types: BJT (Bipolar Junction Transistor), MOSFET (Metal-Oxide Semiconductor Field Effect Transistors) and IGBT (Insulated Gate Bipolar Transistors). Then to compare the wave results of the three transistor switching by observing through an oscilloscope. The experiment was also done by changing the duty cycle and resistant.

From observation results, the good switching is produced by the MOSFET because the MOSFET produces the output wave form that is more like a square wave compared with the BJT and IGBT. This is also caused that MOSFET is generally produced for electrical switching with high frequency. While the resulting BJT switching, produces waves that not in line with the increase of given duty cycle that is given. In addition, the value of the applied source at the BJT collector also effects the switching characteristics of BJT. When BJT and IGBT are given duty cycle of 90% and 100%, BJT and IGBT produces DC waves with the same value.

Keywords: chopper, MOSFET, BJT, IGBT and switching.