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Thesis Title : Static Continuous Variable Low Harmonics Sinusoidal Power Supply.

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Academic year : 1991

Abstract

Nowadays , the need for variable voltage power supply which produces sinusoidal output is still high, for example in electroplating application. The most popular method of varying the output voltage is to use autotransformer. However , the disadvantages of this method are high cost , heavy weight , maintenance of contacts , as well as, difficulty in implementing the closed loop voltage control. Another method is to use ac chopper circuit for voltage variation. This method produces nonsinusoidal output voltage , which results in undesirable high percentages of ripples after rectification.

The thesis presents the research , design and development of a static continuous variable low harmonics sinusoidal power supply. The harmonics elimination technique by assigning appropriate switching angles is used to get rid of the harmonics lower than the order 19 th. Higher harmonics are eliminated by optimum filter . The phased displacement technique is imployed for voltage variation from zero to rated volt.

Microcontroller 8031 is used as control processing unit which generates switching pulses from the precalculated switching angle stroed in the EPROM. The displacement of phases of the control pulses is also performed by the microcontroller when it recieves the signal from the voltage controller. The power circuit is a full bridge single phase transistor inverter. The analog controller is employed for

voltage control. In the design of LC filter, unity voltage and current gain, and the total harmonics distortion lower than 5% are used as design criteria for optimum filter.

The power supply constructed can give continuous variable output from zero to 218 volts at 1.9 A maximum. The total harmonics distortion is lower than 5% at the voltage ranging from 20 volts upward. The results of the thearetical calculation and laboratory measurement are presented.