

UNIVERSITY COLLEGE SEDAYA INTERNATIONAL  
SCHOOL OF ENGINEERING  
FINAL YEAR PROJECT

DEVELOPMENT OF SINE WAVE BASED INVERTER  
FOR ELECTRICAL DRIVES

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## Abstract

This report provides an insight into an attractive method of Sinusoidal pulse width modulation (SPWM) voltage control for single-phase inverter. According the research, it is the ideal voltage control for single-phase inverter. This form scheme is widely researched topic as voltage control is capable of producing superior dynamic performance. The single-phase inverter used the SPWM generator to control the fast switching speed Power MOSFET. The Sinusoidal pulse width modulated output waveform of the full bridge can be obtained from the switching sequence of the four static switches of the inverter resulting from the sine triangular comparison. The carrier waveform is common to both legs of the inverter and the two sinusoidal reference waveform one for each leg of the inverter. The reference waveforms are phase-shifted by  $180^\circ$ . The on switching instants of each static switch are marked based on the sine triangular intersection; the off switching of the other switch on the same inverter leg occurs ideally at the same instant. In additional, shut down the inverter occurs if the bad current decays through the internal diodes of the Power MOSFET by using product of International Rectifier, IR2110 and IRC630. The circuit design, simulation and practical result demonstrate the capability of the DC-to-AC converter to perform the desired outcomes. Two import applications in industrial are (1) adjustable speed AC motor drives and (2) uninterruptible power supply (UPS). For adjustable speed AC motor drives, it is

used to control the speed to operate AC motor drive; for uninterruptible power supplies (UPS), it is used to solve the power interruptions (blackout or blowout).

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