

# Multilevel Inverter Based on Switched-Capacitance Structure

## Abstract:

Multilevel inverter is a power electronic device capable of providing desired output using multiple lower level DC voltages as an input. Multilevel inverters are gaining popularity over conventional two level inverters because it can produce a smoother stepped output waveform. Moreover, the output obtained from multilevel inverters has lower dv/dt and lower harmonic distortions. Multilevel inverters usually make use of diode clamped, flying capacitor or cascaded H-bridge topologies. These topologies suffer from disadvantages such as multitude of components, large size and cost as well as complex control. This project aims to use a switched-capacitance (SC) structure to overcome the disadvantages of the existing topologies. It involves adding an SC structure to the H-bridge inverter using capacitors, switches and diodes to create a multilevel DC voltage at the DC bus of the H-bridge circuit. The proposed technology will improve upon the existing technology by having boost operation without magnetic elements, fewer components, less complex control and using only one power DC source. This project work involves the simulation and hardware implementation of Switched Capacitance Multilevel Inverter

## Hardware and software requirements:

- DSO (Analysis).
- DSP (Controller).
- Function generator (Analysis and references).
- MATLAB (Simulation).
- Proteus (Design).
- Tex studio (Documentation).

## References:

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[2] Barry W Williams, "Principles and Elements of Power Electronics Devices, Drivers, Applications and Passive Components", 2006, ISBN 978-0-9553384-0-3.

[3] Yuanmao Ye, K.W.E. Cheng, Junfeng Liu and Kai Ding, "A Step-Up Switched-Capacitor Multilevel Inverter With Self-Voltage Balancing", *IEEE Trans. Ind. Electron*, Vol. 61, No. 12, December 2014.

[4] Bhagyalakshmi P S, Beena M Varghese and Dr. Bos Mathew Jos, "Switched Capacitor Multilevel Inverter with Different Modulation Techniques", *International Conference on Innovation in Innovations in information Embedded and Communication Systems, 2017*.