SPWM GENERATOR MIXED SIGNAL

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8th October 2022

Abstract –

Sinusoidal Pulse Width Modulation (SPWM) inverter pulse Generator circuit, which can be used to educate Electronics Engineering undergraduate students the structure and behavior of a SPWM's inverter pulse generator. The developed electronic circuit is implemented using low cost and reliable electronic parts.

Keywords: Sinusoidal Pulse Width Modulation, Inverter.

Fig 1: Circuit Diagram

Reference: Circuit Details

Fig 1, Shows the entire circuit Diagram. This circuit actually used to generate SPWM (Sinusoidal Pulse Width Modulation). The circuit has a triangular waveform generator, a comparator and a digital flip-flop.

Op-amps are used for generating the triangular waveform. Here op-amps are used as an integrator circuit. The frequency of the integrator circuit is determined by,

$$Frq = (R5 + VR1) / 4R3C1R4 \quad (1)$$

Whereas, R5 = feedback resistor of second op-amp, VR1 = Voltage between R1, R3 = resistor in non-inverting terminal of first op-amp, C1 = value of C1 capacitor, R4 = value of R4 resistor.

Comparators are the device that compares two analogue voltages or currents and switches it output to indicate which one is larger [1].

D flip-flop that can handle data at high- frequencies with low power utility was implemented and succeeded. The detailed D flip-Flip Circuit is Fig 2. To avoid these glitches output of the comparator is passed through a D flipflop.

Reference Circuit:

Fig 2: D Flip-Flop

Reference Waveform:

Fig 3: SPWM wavforms

Fig 4: D Flip-Flop

References:

[1] Khulesh Sahu, Ravi Tewari “Study of different type of comparator”.

[2] SPWM Signal : https://youtu.be/XhgV6YUaMZA