

Lab 3 Inverter output analysis

Quasi-square wave interters

Using the M-File `qsqwave1.m` adjust the output duty in the range 0.1 to 0.9 (in steps of 0.1) and record the Total Harmonic Distortion (THD) and magnitude of the fundament output frequency at each step. Using the duty cycle on the x-axis, plot the THD and the magnitude of the fundamental output frequency.

Note THD and the magnitudes of the fundamental, third, fifth and seventh harmonics when the duty cycle is set to 0.5

Sinusoidal PWM inverters.

Using the M-File `spwm1.m` adjust the amplitude modulation index in the range 0.1 to 1.5 (in steps of 0.1) and record the magnitude of the fundamental output frequency at each step. Using amplitude modulation as the x-axis plot the amplitude of the fundamental output frequency. Comment on the linearity or otherwise of this plot.

Note the magnitudes of the fundamental, third, fifth and seventh harmonics when the amplitude modulation index is set to 0.9. Compare these results with those of the quasi-square wave output when the duty is 0.5.

Inverters are powered from a DC supply often obtained by rectifying the incoming mains voltage. Assuming the DC voltage is at 600V (**DCBridgeVoltage** in `spwm1.m`), what should the amplitude modulation index be to achieve a fundamental output magnitude of 540V (approx $380 \cdot \sqrt{2}$)?