

The Buck EIE inverter is capable of generating output voltages of various shapes and frequencies. Figure 14 shows the resulting output voltage for voltage reference at 20Hz and Figure 15 at 200Hz, both with 100 peak voltage.

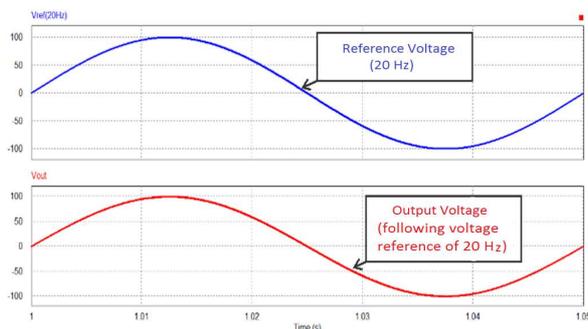


Fig. 14. Frequency inverter following 20 Hz sine reference voltage (simulated waveforms).

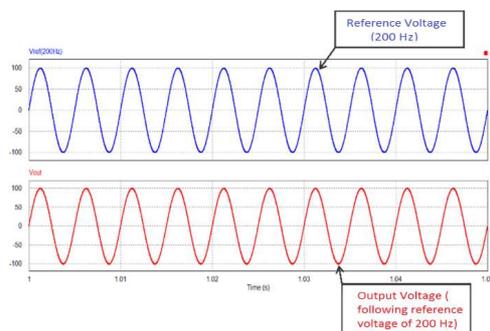


Fig. 15. Frequency inverter following 200 Hz sine reference voltage (simulated waveforms).

As mentioned earlier, this inverter topology becomes very useful for studies in the field of power quality, especially when the scope of study is on the presence and effects caused by the presence of harmonics in the power grid. Figure 16 shows the inverter following a voltage reference composed of sine harmonics, specified in Table VI.

Table VI. - Characteristic of harmonic components present in the established voltage reference

Harmonic Order	Frequency (Hz)	Peak Voltage (V)
Fundamental	60	70
Third	180	30
Fifth	300	50
Seventh	420	10

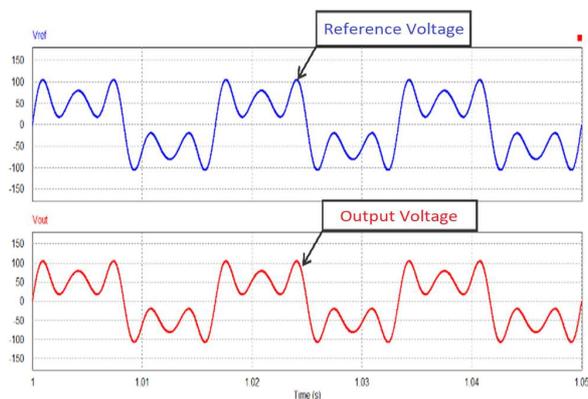


Fig. 16. Frequency inverter following reference voltage with presence of third, fifth and seventh order harmonics

4. Conclusions

A power factor correction stage proposal based on the use of a single phase hybrid rectifier to supply a Buck EIE multi-level inverter was presented. The PFC stage is performed by the association of a controlled rectifier (Sepic) and an uncontrolled one, which is responsible for increasing the overall structure yield. This circuit has as its main function to ensure that the input voltage and current are in phase, resulting in a high power factor (very close to the unit). In addition, it is desired that the output voltages of the hybrid rectifier be kept at a constant value, and that the input current waveform presents low harmonic distortion.

The results obtained through simulations performed in the PSIM v.11 software were very satisfactory, since the Buck EIE inverter provided the desired voltage for the load and the current drained from the mains, besides being in phase with the voltage, presented low DHT.

References

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