Circuit Simulation

by
Miss. Bhakti Khumkar
4th Sem Electrical Engineering,
Yeshwantrao Chavan College Of Engineering, Nagpur

Guided By
Prof. Akshay Kadu, Prof. Nivedita Padole,
Assistant Professor
Department Of Electrical Engineering
Yeshwantrao Chavan College Of Engineering, Nagpur

https://esim.fossee.in/circuit-simulation-project

Title:

Quasi Z source Inverter (QZSI)

Theory/Description:

Z source inverter have unique ability to step up and step down the output voltage with the help of impedance circuit. No additional converter stages are required therefore the conversion efficiency get improved. The first Z source inverter was published in IEEE journal by Dr. F. Z. Peng in the year 2006. Afterwards immense research is carried out by power electronics researchers and different topologies were published. Basic Z source inverter have discontinuous input current, to overcome this drawback Quasi Z source inverter is introduced.

Quasi Z source inverter consist of same number of components as in conventional Z source inverter. In order to overcome the discontinuous current drawback, the position of inductor is changed now in QZSI circuit inductor is placed in series with source therefore the current is continuous which helps to maintain the DC source charge for longer period of time.

QZSI operates in two modes shoot through and non-shoot through mode. During shoot through mode both the switches of same leg is on during this period of time impedance circuit stores energy and during non-shoot through period the energy stored by Z network plus source energy will appear across the load therefore will get the boosted output. This QZS inverter can be controlled by controlling modulation index as well as shoot through duty cycle to get the desired output
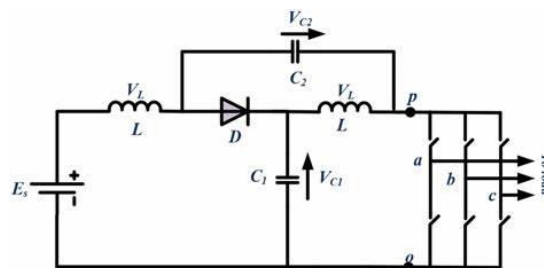
Circuit Diagram:

Fig.1 Quasi Z Source Inverter

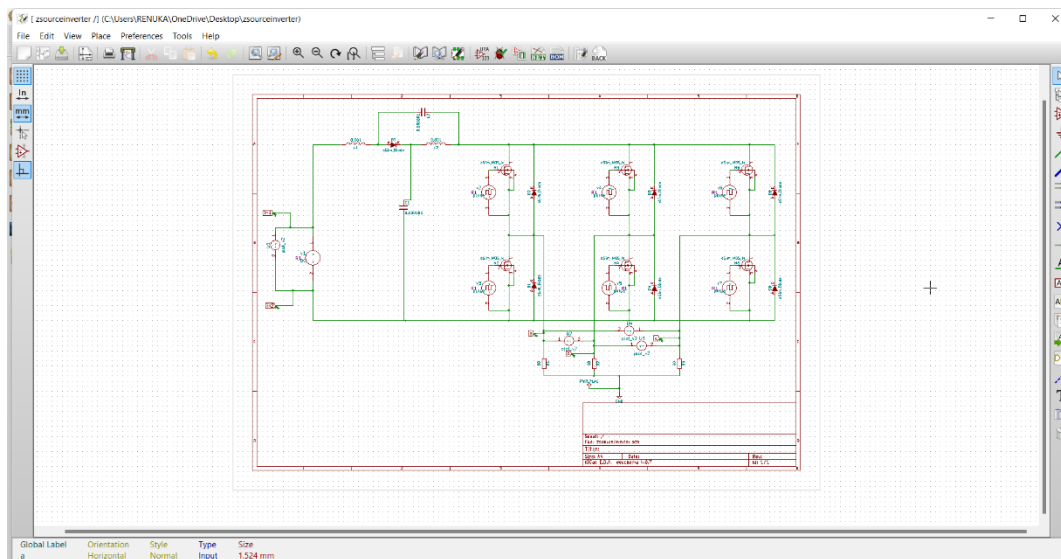**Results/ Output (ngspice and Python plots)**

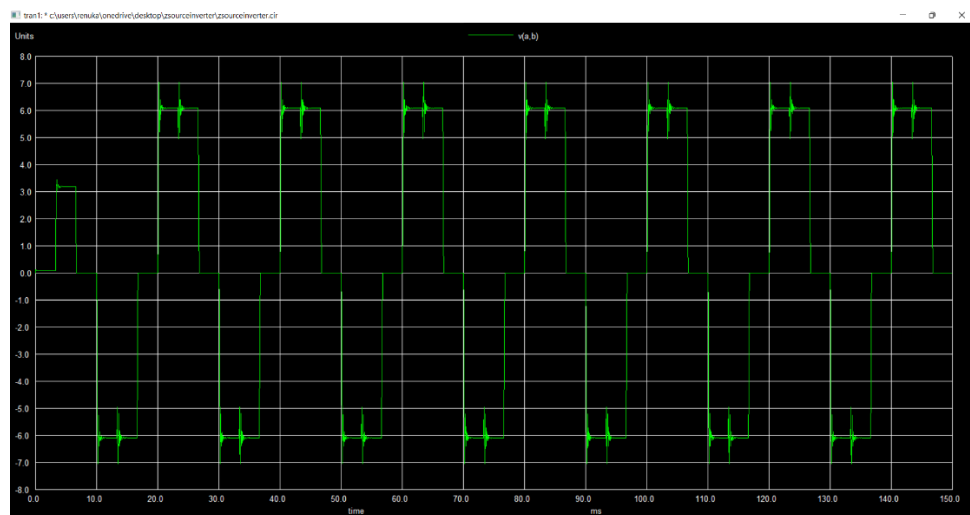Fig. 2 esim circuit of Quasi Z source Inverter

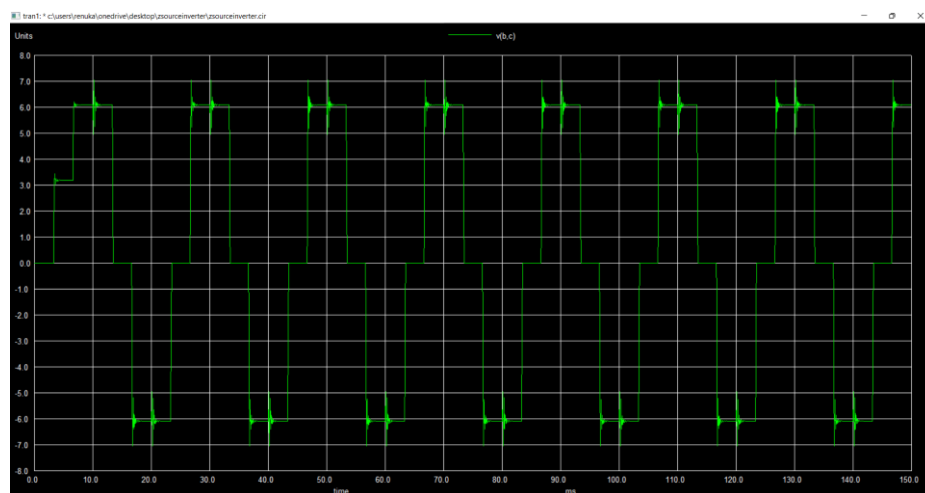Fig. 3 Ngspice plot of output voltage across a phase

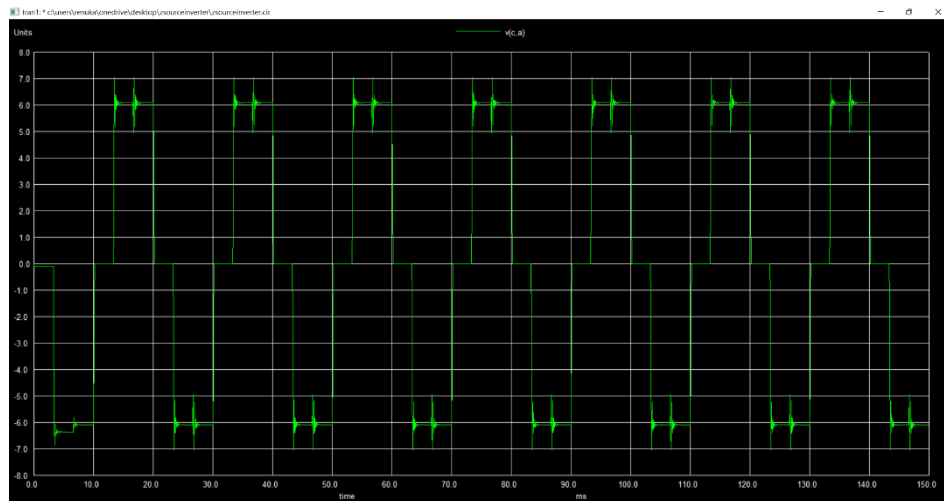Fig. 4 Ngspice plot of output voltage across b phase

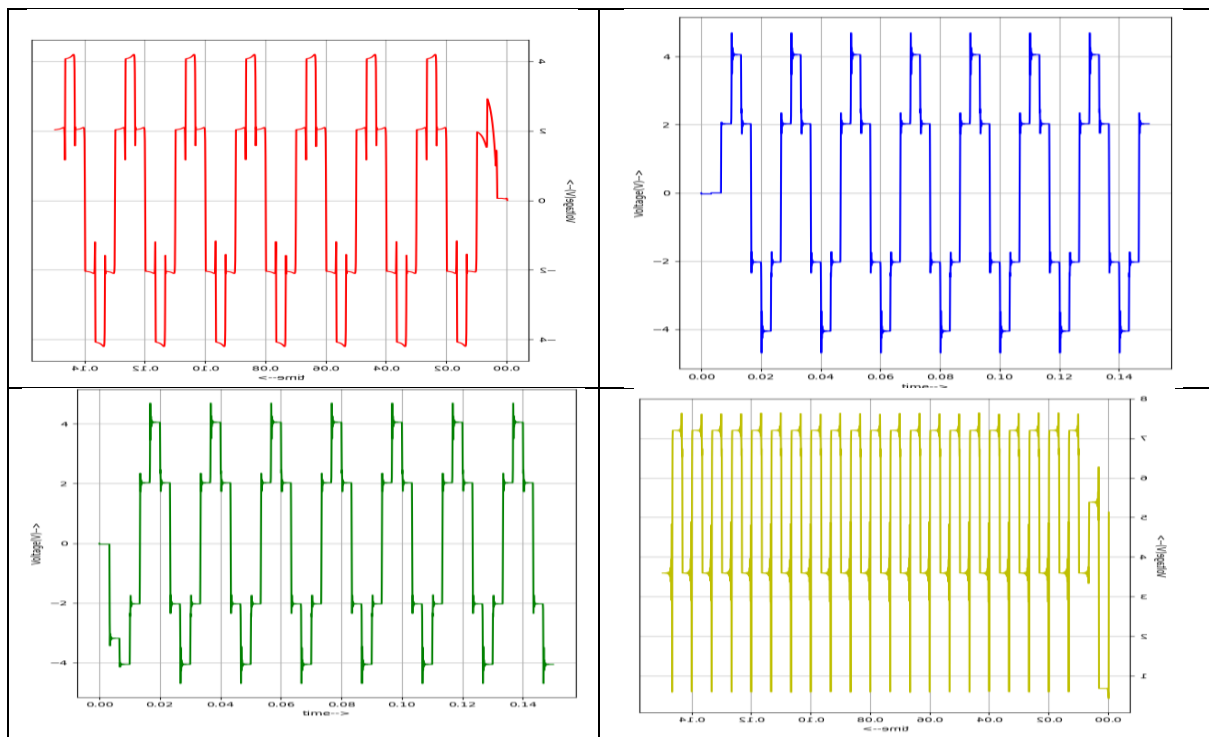Fig. 5 Ngspice plot of output voltage across c phase

Fig. 6 Python plot of Output Voltage Va, V_b, Vc and Input DC voltage

Conclusion: Quasi Z source Inverter circuit is simulated successfully using esim software.

Source/Reference(s): Joel Anderson and F.Z. Peng, Four quasi-Z-Source inverters published in 2008 IEEE Power Electronics Specialists Conference.