5. Experimental Results

The proposed circuit is developed and analyzed with MATLAB software. For analysis DC voltage from PV system is considered as 24 volt then it is given to proposed resonant converter as input, converter output voltage is fed to a PMDC motor.

MATLAB simulation circuit diagram, resultant waveforms for converter output voltage, current and motor speed is given below.

6. Resultant Waveforms

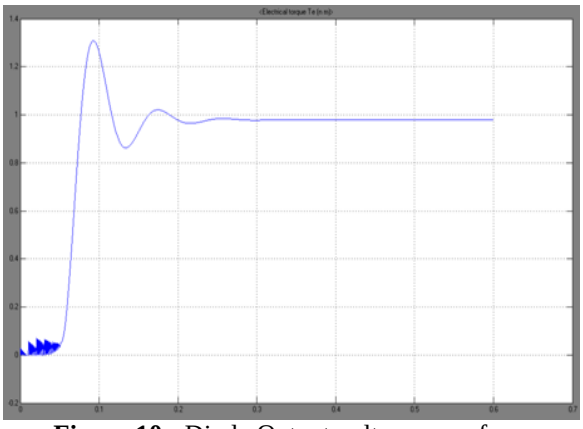

Figure 10: .Diode Output voltage waveform

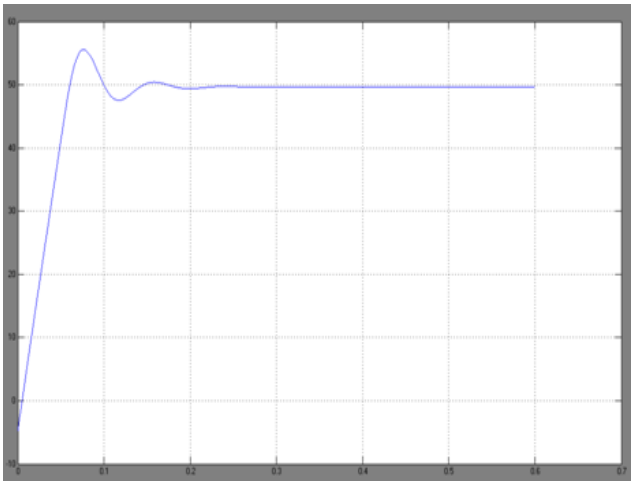

Figure 11: .Motor torque waveform

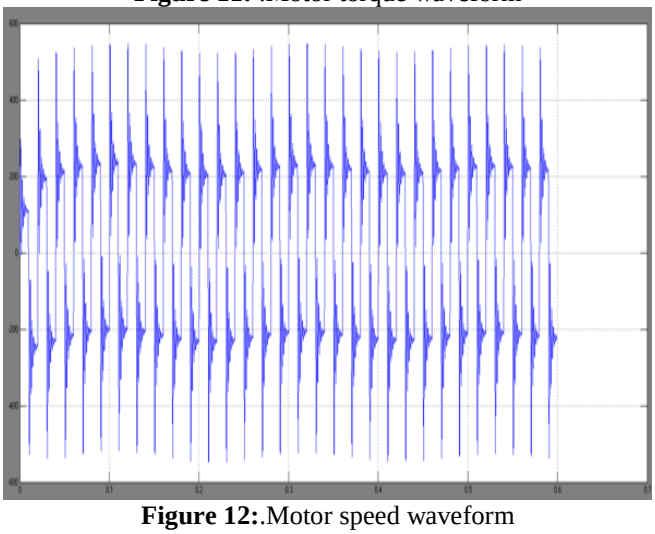

Figure 12:.Motor speed waveform

7. Conclusion

The converter proposed eliminates the adverse effects of the freewheeling mode of operation,as well as the voltage spikes at the secondary side of the transformer, which are intrinsic to the conventional full-bridge converters. The proposed converter assures reliable operation at no load by applying the symmetric auxiliary circuits on both legs of the full-bridge converter. Better efficiency of the proposed converter over entire range of operation not only validate the operation of the converter but also confirm the superiority of the proposed topology over the conventional full-bridge converter.

References

[1] Jinzhou Jiang ; Gengyin Li ; Ming Zhou, "Current type inverter control strategy for harmonics and three phase imbalance elimination in micro grid", IEEE Transactions on Power Electronics 2014

[2] Enhui Chu, Xutong Hou, Huaguang Zhang, *Senior Member*, *IEEE*, Mengyang Wu, and Xiuchong Liu "Novel Zero-Voltage and Zero-Current Switching (ZVZCS) PWM Three-Level DC/DC Converter Using Output Coupled Inductor", IEEE Transactions on Power Electronics, vol. 29, no. 3, March 2014

[3] H. Cha, L. Chen, R. Ding, Q. Tang, and F. Z. Peng, "An alternative energy recovery clamp circuit for full-bridge PWM converters with wide ranges of input voltage," IEEE Trans. Power Electron., vol. 23, no. 6, pp. 2828–2837, Nov. 2008.

[4] K. Raggle, T. Nussbaumer, and J. W. Kolar, "Guideline for a simplified differential-mode EMI filter design," IEEE Trans. Ind. Electron., vol. 57, no. 3, pp. 1031–1040, Mar. 2010.

[5] Hyungjoon Kim, Changwoo Yoon, and Sewan Choi, *IEEE Senior Member* Seoul National University of Technology Dept. of Control and Instrumentation Eng. "A three-Phase ZVZCS DC-DC converter for fuel cell applications"

[6] J. G. Cho, J.W. Baek, D.W. Yoo, H. S. Lee, and G. H. Rim, "Novel zerovoltage and zero-current-switching (ZVZCS) full bridge PWM converter using transformer auxiliary winding," in *Proc. 28th Annu. IEEE Power Electron. Spec. Conf., (PESC)*, vol. 1, St. Louis, MO, Jun. 22–27, 1997, pp. 227–232

[7] Fuxin Liu, Jiajia Yan, and Xinbo Ruan **2010(5).**Zero-Voltage and Zero-Current-Switching PWM Combined Three-Level DC/DC Converter, May. 2010

[8] R. Ayyanar and N. Mohan, "Novel soft-switching DC–DC converter with full ZVS-range and reduced filter requirement. I. Regulated-output applications, *IEEE Trans. Power Electron.*, vol. 16, no. 2, pp. 184–192, Mar.2001.

[9] H. Liu, Z. Q. Zhu,Y. Fu, and X. Qi, "Flux-weakening control of nonsalient pole PMSM having large winding inductance, accounting resistive voltage drop and inverter nonlinearities," IEEE Trans Power Electron., vol. 27, no. 2, pp. 942–952, Feb. 2012.

[10] M. Mengoni, L. Zarri, A. Tani, G. Serra, and D. Casadei, "A comparion of four robust control schemes for field-weakening operation of induction motors,"

IEEE Trans. Power Electron., vol. 27, no. 1, pp. 307–320, Jan.2012.

[11] D. Zhang, F. Wang, S. EI-Barbari, J. A. Sabate, and D. Boroyevich, "Improved asymmetric space vector modulation for voltage source converters with low carrier ratio," *IEEE Trans. Power Electron.*, vol. 27, no. 3, pp. 1130–1140, Mar. 2012.