Due to the stochastic nature of climatic condition, the PV output voltage at the maximum power point (MPP) is changed. By controlling the PV output voltage to track the varying MPP as shown in Figure 13, the proposed system can capture the maximum PV power, which is changed irregularly in Figure 13(c). With the power compensation of battery, the smooth grid power is provided by the proposed system, as shown in Fig. 13(f). It is observed that the power smoothing performance of the CHB based system is similar to that of the paralleled inverters system in Fig. 13(a), (c) and (e).

Finally, the performances of the two systems under the 30% grid voltage dip fault are compared. For outputting the power of 3kw through the PV inverter, the paralleled inverters configuration requires higher inverter current compared to the proposed hybrid system, that the proposed system has lower power ripples under this condition.

6. Conclusion

By using the PV array and the battery as the separate DC links for the CHB inverter, the hybrid system offers the multilevel output voltages and lower steps in the CM and DM voltages. Thus, the better EMC and THD performance are given. The proposed hybrid system can smooth the irregular PV power and limit the grid current under grid voltage dips. The improved operating performance of the proposed seven level inverter output voltages, harmonic performance of grid current and THD has been verified by computer simulation.

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