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HYBRID CONVERTER WITH SIMULTANEOUS DC AND AC OUTPUT WITH A COMMON DC SOURCE

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SYNOPSIS

In this current era, there is a growing demand for power in a wide range of applications: portable consumer devices, hybrid/electric vehicles, industrial control systems etc. This has led to the increasing adoption of two traditional converter topologies viz., Voltage Source Inverter (VSI) & Current Source Inverter (CSI), which provides increased energy savings over conventional on/off control. Our project introduces a hybrid converter topology that can simultaneously provide AC as well as DC from a common DC source. In the proposed circuit, the conventional boost converter control switch is replaced by a VSI, in order to derive both AC & DC output simultaneously. Both the outputs are controlled by set of four switches (S1-S4), and protection is ensured by the antiparallel diode across switches. Arduino software tool is used to generate pulse for the control switches. The main advantages of this proposed system are reduced number of switches, increased reliability and inherent shoot through protection in inverter stage which are not possible in the conventional VSI. Recently, renewable energy sources are playing more important role due to environmental related problem made by conventional power generation, free trade of power and growth in power electronics. This leads to growth of nano- grid architecture merged in modern smacking residential electric power system. In this architecture both DC as well as AC loads are effectively interlinked with different kind of energy sources (conventional or non-conventional) using power electronic converters, in which the hybrid converter plays a vital role. Our project involves the software implementation using MATLAB/Simulink and hardware implementation. Its experimental results validate the operation of the circuit design.