THREE-PHASE PWM RECTIFIER BASED ON INTEGRATED POWER MODULE AND FIXED-POINT DIGITAL SIGNAL PROCESSOR FOR RAPID PROTOTYPING ISSUES

The paper presents a laboratory test-bench with a three-phase two-level PWM rectifier. The setup is based on a 3.3kW integrated power module and a 32-bit fixed-point digital signal processor with a Simulink auto coder for rapid prototyping of control strategies. The setup has been diversified into separate modules for different tasks: grid voltage and grid current measurement modules, hardware dead-time block with IGBT gate signal inverted logic driver, analogue signal processing block for sensor-to-processor interface, auxiliary control electronics and power circuits with overvoltage and overload protections. These modules assembled in unit provide entire functionality of the laboratory setup with the PWM rectifier for flexible and fast implementation of control strategies either for their further development or for the purpose of didactics. In order to demonstrate the operation of the proposed test-bench Sliding-Mode Voltage Oriented Control with δ-PWM has been implemented to control the PWM rectifier. Numerous experimental results have been presented and discussed.

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