UTILITY INTERFACED PULSE-WIDTH MODULATION OF SOLAR-FED VOLTAGE SOURCE INVERTER WITH CURRENT CONTROLLED OPERATION AT UNITY POWER FACTOR

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In this report the basic principles of grid-connected inverter system were reviewed. A utility interfaced pulse-width modulation of solar-fed voltage source inverter with current controlled operation at unity power factor is presented and the principles of operation

were explained. Its simulation was done and the results were shown in chapter 3 and 4. The important aspect of this presented project is the high accuracy of tracking and tracing of the reference current by inductor current within hysteresis current band limits which made the filtered inverter output current to be properly synchronized with the grid utility voltage at a unity power factor. The two methods of hysteresis band current controller applied separately on controlling the injection of current to the grid utility are fixed-band and sinusoidal band current controllers in which their results were compared.

The uninterruptible power supply (UPS) without battery back-up system was implemented in the laboratory instead of single phase grid-connected solar-fed PWM voltage source inverter (the proposed system). It is due to the lack of appropriate IC components (such as tamura current sensor for current detection) used in the implementation of the proposed system in our local market. The circuits for the execution of UPS are shown in the appendices (B, C, F, G, H, I).

In the implementation of uninterruptible power supply without battery-back-up system ,the PI controller was used to ensure voltage stabilization. The boost converter switch was used in geometrical error-voltage compensation by its action of turning ON and OFF. The laboratory results displayed on the oscilloscope are shown in the main body of the work.

Finally, the summary and the way forward for the future improvement on the

implementation of the grid-connected PWM voltage source inverter system in a broader sense were equally stated.