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MINISTRY OF ELECTRONICS AND INFORMATION TECHNOLOGY

iTNT TAMILNADU TECHNOLOGY HUB

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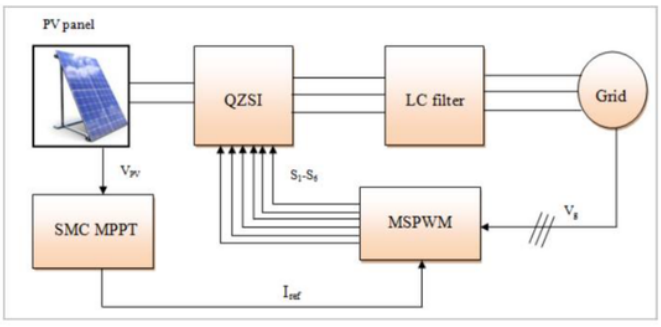
A NOVEL MODULATION TECHNIQUE FOR GRID CONNECTED THREE PHASE QUASI Z SOURCE LINE SYNCHRONIZED INVERTER

Seeking parties interested in licensing and commercialization of technology.

Technology Brief

This technology discloses an advanced modulation technique and pulse-width modulation (PWM) control strategy for a grid-connected, three-phase quasi-Z-source line-synchronized inverter system. The innovation optimizes the shoot-through state insertion within the inverter's switching sequence to achieve continuous conduction mode, precise voltage boost capability, and seamless AC grid synchronization. By suppressing common-mode voltage spikes and minimizing harmonic distortion, the control scheme significantly enhances power transformation efficiency, reduces thermal stress on switching components, and maintains stable grid integration across fluctuating renewable energy inputs.

Block Diagram



Technical Applications

This modulation technique is primarily suited for grid-tied solar photovoltaic (PV) power plants, wind energy conversion systems, and hybrid microgrid installations. It is equally applicable to industrial motor drives, uninterruptible power supplies (UPS), and energy storage power conversion systems (PCS) where high efficiency, buck-boost voltage operation, and low total harmonic distortion (THD) are essential for grid compliance.

Salient Features

- Optimized Shoot-Through Modulation
- Enhanced Grid Synchronization & Low THD
- Superior System Efficiency

Glimpse of the Technology

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TECHNOLOGY SECTOR
Electronics & Semiconductors

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TECHNOLOGY READINESS LEVEL
TRL 3

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