# Standalone PV-Based Single-Phase Split-Source Inverter using Model-Predictive Control

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**K**EYWORDS

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**Abstract** This paper proposes the control of single-phase split-source inverter (SSI) for a standalone PV application using model-predictive control scheme. The PV system under investigation consists of PV modules, single-phase SSI, battery bank for energy storage, and DC-DC bidirectional converter to allow for bidirectional power flow with the batteries. Maximum power is extracted from the PV array using PI-based incremental conductance method. Both the maximum power point tracking of the PV modules and the synthesis of the sinusoidal output load voltage are achieved using the SSI. The control of the bidirectional converter is carried out using PI controllers to regulate the DC-link voltage. Selection of the controllers parameters is achieved using Harris Hawks optimization technique. Simulation results show that the system has succeeded in producing a constant DC-link voltage and well-regulated AC load voltage with low THD under various operating conditions. Experimental results verify the system performance.