

# An experimental simulation testing of single-diode PV integrated mppt grid-tied optimized control using grey wolf algorithm

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**Abstract:** In the context of this paper a three phase grid connected Photo-Voltaic (PV) system that is used to design with MPPT and developed Grey Wolf optimization (GWO) algorithm for analyzing the power quality issues in the grid system. The proposed Grey Wolf optimization (GWO) algorithm is incorporated in the prototype model and compared with other related optimization algorithms namely Particle Swarm Optimization (PSO) and Genetic Algorithm (GA). The various loading conditions as well as solar irradiances are modeled by using MATLAB simulation and experimentally validated by a DSPIC (DS 1104) based prototype model. A three phase PV grid connected non-linear load is observed in different operating environmental conditions. The optimization control algorithms was developed and implemented in Super-Lift Inverter (SLI) grid connected system. The findings of this work are, grid reactive power demand is compensated using DSTATCOM, and also from the real power of renewable energy system. But, majority of the active power is provided or absorbed by DSTATCOM component. The objective of this proposed work is that the three optimization control algorithms are examined, and the PV integrated grid tied system maintains a compensation power at Unity Power Factor (UPF). The proposed optimization methods produce load output power factor values such as 0.89 (GWO), 0.88, (PSO) and 0.86 (GA).

**Keywords:** PV system, particle swarm optimization, genetic algorithm, Grey Wolf optimization, Grid

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