

## 基于改进粒子群优化算法的电力市场下的无功优化

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### 摘要

在厂网分开、竞价上网的市场模式下综合考虑电力系统安全约束, 建立了以有功网损和无功费用最小为目标函数并包含各种运行约束条件的电力系统无功优化数学模型。应用改进粒子群优化算法求解该无功优化模型, 并结合动态调整罚函数法将无功优化问题转化成无约束求极值问题, 从而有效地提高了改进粒子群优化算法的全局收敛能力和计算精度, 使电网公司取得了最大经济效益。以IEEE30节点系统为例进行了仿真计算, 结果表明了本文采用的无功优化模型和算法的正确性、适用性和较好的经济性。

关键词 [电力市场](#); [无功优化](#); [改进粒子群优化算法\(MPSO\)](#); [罚函数](#)

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## Research on MPSO Algorithm Based Reactive Power Optimization in Electricity Market

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### Abstract

Under the marketing mode that power plants are separated from power network and bidding based transaction of generated power, comprehensively considering security constraints of power system, the authors build up a reactive power optimization model in which active network loss and reactive power cost are brought into objective function and various operation constraint conditions are included. The modified particle swarm optimization (MPSO) is utilized to solve the proposed reactive power optimization model; and combining with non-stationary multi-stage assignment penalty function, the reactive power optimization problem is transferred into a problem to solve extreme-value without constraints, thus the calculation accuracy and global convergence ability of MPSO are effectively improved, and power grid company can achieve maximal economic benefit by means of the proposed algorithm. Simulation of the proposed algorithm by IEEE 30-bus system is conducted, simulation results validate the correctness, adaptability and better economy of the proposed MPSO algorithm.

Key words [electricity market](#); [reactive power optimization](#); [MPSO algorithm](#); [penalty function](#)

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