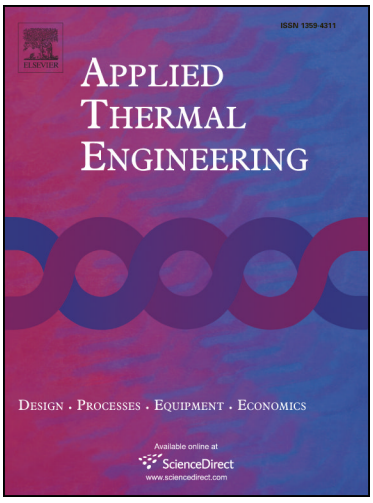

Research Paper

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Robust thermal and electrical management of smart home using information gap decision theory

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Abstract

After restructuring in the electricity industry, some concepts such as smart home and renewable energy sources improved extensively. This paper proposes information gap decision theory (IGDT) technique for robust energy management of smart home in summer season in the presence of market price fluctuation. Therefore, the proposed model is practical in a realistic model. The IGDT method contains the robustness and opportunity functions. The harmful aspect of price uncertainty is modeled by robustness function and the beneficial aspect of price uncertainty is modeled by opportunity function. The proposed IGDT-based performance optimization problem of low-energy smart home is formulated as mixed-integer non-linear programming (MINLP) and solved by General Algebraic Modeling System (GAMS) optimization software. Two scenarios as normal and smart scenarios are used to investigate the proposed model.

Key words: Smart home, information gap decision theory (IGDT), thermal and electrical management, battery storage, fuel cell cogeneration system.