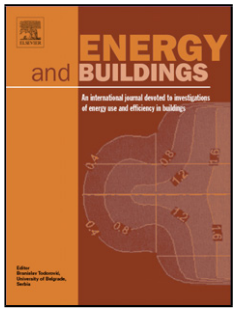

Title: Interval Number Optimization for Household Load Scheduling with Uncertainty

Author: Jidong Wang Yinqi Li Yue Zhou

PII: S0378-7788(16)30790-3
DOI: http://dx.doi.org/doi:10.1016/j.enbuild.2016.08.082
Reference: ENB 6981

To appear in: *ENB*

Received date: 10-1-2016
Revised date: 22-6-2016
Accepted date: 27-8-2016

Please cite this article as: Jidong Wang, Yinqi Li, Yue Zhou, Interval Number Optimization for Household Load Scheduling with Uncertainty, Energy and Buildings http://dx.doi.org/10.1016/j.enbuild.2016.08.082

Interval Number Optimization for Household Load Scheduling with Uncertainty

Jidong Wang[1],Yinqi Li[a], Yue Zhou[b]

Key Laboratory of Smart Grid of Ministry of Education, Tianjin University, Tianjin 300072, China

[1]Corresponding author. Tel. + 86 13652157798E-mail address: jidongwang@tju.edu.cn
Address: School of Electrical Engineering & Automation, Tianjin University, Tianjin, 300072, China

[a,b]E-mail:yinqili@tju.edu.cn; yuezhou2011@gmail.com

Highlights

- Household load scheduling with uncertain-but-bounded parameters is analyzed.
- Interval number optimization is introduced in the household load scheduling.
- Energy cost decreases with the increase of tolerance degrees.
- Feasible schemes which are robust to uncertainties could be obtained conveniently.

ABSTRACT

An interval number optimization method is proposed in this paper to tackle the household load scheduling problem with uncertain hot water demand and ambient temperature. The household loads considered include residential thermostatically controlled loads such as electric water heater and air conditioner, and interruptible loads such as clothes washer and pool pump. The uncertain-but-bounded parameters are modeled as interval numbers, based on which the uncertain load scheduling problem is formulated and transformed. A binary particle swarm optimization combined with integer linear programming is introduced to solve the transformed problem. Two schemes, named cost scheme and trade-off scheme, are contrastively discussed to study the economic impacts of different tolerance