Discussions and Closures

Correction to "Artificial Neural Network-Based Peak Load Forecasting Using Conjugate Gradient Methods"

Lalit Mohan Saini and Mahender Kumar Soni

In the above paper[1] the author photos of Lalit Mohan Saini and Mahender Kumar Soni appearing on page 912 of the August 2002 issue of TRANSACTIONS ON POWER SYSTEMS were inadvertantly transposed. The IEEE regrets the error.

Manuscript received November 26, 2002.
The authors are with the Department of Electrical Engineering, National Institute of Technology, Kurukshetra, HR 136119, India (e-mail: lmsaini@hotmail.com; mksoni123@hotmail.com).
Digital Object Identifier 10.1109/TPWRS.2002.807163

[1] *IEEE Trans. Power Syst.*, vol. 17, pp 907–912, Aug. 2002.

Discussion of "Application of Mechanism Design to Electric Power Markets"

Fushuan Wen

I. DISCUSSION

I wish to commend the authors for their pioneer contribution on the application of mechanism design to electricity markets. I would like to seek the authors' clarifications on the following points.

1) In Section I of the above paper,[1] in the second paragraph, it is stated that "In this paper we propose solving the congestion problem through a technique in economics, called mechanism design." In fact, the work presented in this paper is to provide an incentive mechanism for generating companies to bid at their true marginal costs, rather than for congestion management.
2) In Section II-B, it is assumed that a generator j regards the marginal cost of another generator i ($i \neq j$) as a random variable from a commonly known distribution. Does this assumption mean that the estimated marginal costs of generator i by all j ($j = 1, 2, \ldots, N_g$ and $j \neq i$) are the same? If so, this is a very strong assumption.
3) The Appendix does not show fully how (6) can be obtained. The meanings of $\overline{q_i}(\cdot)$ and $\overline{\Psi}_i(\cdot)$ in (6) are not very clear. As I understand, the "information compensation" as shown in (6) should be determined by such an organization like the ISO or pool operator, and hence a question arises: why is this compensation payment dependent on the two parameters, $\overline{q_i}(\cdot)$ and $\overline{\Psi}_i(\cdot)$, estimated by generator i? How does the ISO or pool operator know these two parameters and how can the "information compensation" payment be fair among generating companies?
4) Since the cost for the "information compensation" to generating companies will ultimately be paid by the customers, determination of such a payment should not only cater for the benefits of generating companies, but also the utilities of customers. If this payment is too large, customers can not benefit from the proposed mechanism and will challenge its reasonableness. Hence, as I understand, a more reasonable mechanism is to provide incentives which can lead to maximization of social welfare. The market mechanism presented in this paper only takes into account of the profits of generating companies.

Once again, I congratulate the authors for their interesting paper.

Manuscript received September 27, 2001.
The author is with the Department of Electrical and Electronics Engineering, University of Hong Kong, Hong Kong (e-mail: fswen@eee.hku.hk; wenfs@hotmail.com).
Digital Object Identifier 10.1109/TPWRS.2002.804964

[1] C. Silva, B. F. Wollenberg, and C. Z. Zheng, *IEEE Trans. Power Syst.*, vol. 16, pp. 1–8, Feb. 2001.

Closure on "Application of Mechanism Design to Electric Power Markets"

Carlos Silva and Bruce F. Wollenberg

The authors appreciate the interesting comments expressed by Prof. Wen in the above discussion.[1] Our comments are numbered to match the points made in Prof. Wen's discussion.

1) Congestion is a byproduct of free markets. When participants schedule their transactions in a noncentralized manner, they may overuse some transmission paths forcing a central entity to curtail their transactions to manage congestion. However, when the dispatch is centralized there is no need for congestion management. Therefore, congestion management is a key byproduct of our mechanism.
2) We decided to use the same probability distribution to simplify the application. However, different probability distributions can be used. The researcher must then be careful trying to keep the complexity of problem bounded. An approach such as this can go as follows: different generators, other than i, may think that the true cost of generator i is based on different probability distributions. At the same time, generator i may also have a different idea of what the others believe its cost to be, and so on and so forth. This analysis can be extended indefinitely, the researcher must then bound the problem using a reasonable assumption.
3) In order to calculate $\overline{q_i}(\cdot)$ and $\overline{\Psi}_i(\cdot)$ in eqn. (6), the ISO or pool operator will use the probability distributions for the costs for all the participants (other than i). These distributions are common knowledge for all participants, and also for the ISO or pool operator. The objective of the mechanism is to reach an efficient outcome in the **operation** of the system, and it does not necessary give a long-term incentive to build power plants or take power plants out of commission. However, an efficient operation scheme can be used as a cornerstone of a complete framework for the generation sector.
4) In general, participants in a market are free to compete when they can reach an efficient outcome by themselves (competitive equilibrium). However, if the conditions in the market do not allow it to reach this objective, the regulator must modify the rules of the market, creating the right incentives or taxes so an efficient outcome may be achieved.

Manuscript received September 27, 2001.
C. Silva and B. F. Wollenberg are with the Department of Electrical and Computer Engineering, University of Minnesota, Minneapolis, MN 55455 USA.
C. Z. Zheng is with the Department of Economics, Northwestern University, Evanston, IL 60208-2600 USA.
Digital Object Identifier 10.1109/TPWRS.2002.804963

[1] C. Silva, B. F. Wollenberg, and C. Z. Zheng, *IEEE Trans. Power Syst.*, vol. 16, pp. 1–8, Feb. 2001.