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论文

矩阵型网络DEA模型及其实证检验

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Network DEA for Matrix-type Organization with Application

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摘要 针对传统DEA模型无法有效的评价矩阵型网络系统的效率,本文构建了矩阵型网络决策单元的生产可能集,建立了矩阵型网络DEA模型。在此基础上证明了决策单元在矩阵型网络DEA模型下为弱DEA有效的充分必要条件为其每个子系统均为弱DEA有效。最后,选用美国的十个电力公司作为决策单元对模型进行实证检验,得出结论:矩阵型网络DEA模型弥补了传统DEA模型无法反映内部有效性从而可能得到错误结果的缺陷,并能精确地计算出各个子过程的效率,辨识出具体需要改进的子过程。同时新模型为评价复杂系统的效率提供了新的思路。

关键词： 矩阵型结构 网络DEA 子过程效率 单元总效率

Abstract： Considering the problem that traditional DEA model cannot evaluate the relative performance of the matrix-type system effectively, the production possibility set is defined and the network DEA model is established for matrix-type system in this paper. It is proved that the DMUs are weak DEA efficiency if and only if all subsystems of the DMUs are weak DEA efficiency. Using data of ten electric power companies in the United States of America, the network DEA model is tested. The results show that the new model can make up for the drawbacks of the traditional DEA model on ignoring the internal structures. The new model can also evaluate divisional efficiency scores, which can help decision makers to detect the sub-processes needed to be evaluated. Furthermore, the new model provides a new idea for evaluating the relative performance of the complex systems.

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