

动力经济

稳定分布理论下可容许均值 - 刻度参数的购电组合模型

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摘要:

以上网电价服从稳定分布为前提条件, 研究供电公司在多个交易市场中的购电策略。首先, 根据上网电价的特征属性, 分析其概率分布; 其次, 构建协变化系数度量各上网电价之间的相关性, 并从理论上证明其合理性; 再次, 推导出多个服从稳定分布的不独立随机变量的联合特征函数, 并证明以购电组合的刻度参数作为风险度量因子的合理性, 从而解决稳定分布理论在投资组合中运用的2个大难题; 然后, 为解决参数估计存在偏差的问题, 提出可容许均值和可容许风险的概念, 并构建基于稳定分布理论下供电公司的可容许均值 - 刻度参数购电组合模型。算例表明, 美国PJM电力市场的上网电价数据服从稳定分布, 采用所构建的模型能更好地反映它的风险特性, 为供电公司提供更准确的购电决策。

关键词: 稳定分布 风险度量 均值 - 刻度参数模型 可容许风险 模糊优化

Power Purchasing Portfolio Model for Tolerable Mean Scale Parameter Based on Stable Distribution Theory

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Abstract:

The power purchasing strategy for power supply companies in multiple trading markets is studied with the precondition that generation price observes the stable distribution. Probability distribution of the generation price is analyzed according to its characteristic property. The relationship between the multi-generation prices is measured by the correlative variation coefficient and the joint characteristic function of multiple dependent random variables with stable distribution is deduced. Based on this, the rationality of taking scale coefficient as a risk measuring factor for the purchasing portfolio can be proved, which may be used to solve two problems of the stable distribution theory's application to the investment portfolio. The concepts of the tolerable mean and tolerable risk are presented to solve the parameter estimation error. Based on the above power purchasing portfolio model with tolerable mean-scale parameter obeying the stable distribution theory is built for power-supply companies. Examples show that the generation price in the PJM market obeys the stable distribution. The risk characteristic of the proposed model can be reflected better and the model can provide more appropriate purchasing strategy for power-supply companies.

Keywords: stable distribution risk measure mean-scale parameter model tolerable risk fuzzy optimization

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