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Spatial auction markets with unique consumer price

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Abstract

We consider a collection of auctions representing zonal electricity markets, which are joined by transmission lines in a spatial system. At each market, generating companies (traders) and customers (buyers) submit their fixed offer/bid prices together with maximal offer/bid volumes, respectively. In addition to the usual balance and capacity constraints, we consider also the additional requirement of utilizing the minimal unique purchase price for all the zones. As a result, we obtain spatial equilibrium type problems with special parameter for finding zonal prices and offer/bid volumes. We show that the streamlined formulation can be inconsistent under rather natural assumptions and propose a relaxed formulation. This problem admits suitable solution methods. We propose a parametric method combined with a bisection type procedure to solve this problem.

Keywords

Fixed prices, Parametric method., Spatial auction markets, Unique purchase price