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Title: Refinement of symmetrical Nash equilibrium for generalized second-price mechanism in sponsored search advertising

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Abstract: Sponsored search advertising is the most prevailing online advertising instrument, also it is the most important and fastest-growing revenue source for auctioneers. In this paper, we propose a new type of equilibrium refinement concept named "stable Nash equilibrium" for this auction game. We illustrate that the set of all stable Nash equilibria (STNE) of a GSP mechanism keyword auction can be efficiently calculated by a recursive procedure. STNE is either the same as the set of the well-known symmetrical Nash equilibrium or a proper subset of it. These findings free both auctioneers and advertisers from complicated strategic thinking. The revenue of a GSP auction on STNE is at least the same as that of the classical VCG mechanism and can be used as a benchmark for evaluating other mechanisms. At the same time, STNE provides advertisers a simple yet effective and stable strategy. © 2010 IEEE.

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