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Revisiting the Foundations of Dominant-Strategy Mechanisms*

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Abstract

An important question in mechanism design is whether there is any theoretical foundation for the use of dominant-strategy mechanisms. This paper studies the maxmin and Bayesian foundations of dominant-strategy mechanisms in general social choice environments with quasi-linear preferences and private values. We propose a condition called the uniform shortest-path tree that, under regularity, ensures the foundations of dominant-strategy mechanisms. This exposes the underlying logic of the existence of such foundations in the single-unit auction setting, and extends the argument to cases where it was hitherto unknown. To prove this result, we adopt the linear programming approach to mechanism design. In settings in which the uniform shortest-path tree condition is violated, maxmin/ Bayesian foundations might not exist. We illustrate this by two examples: bilateral trade with ex ante unidentified traders and auction with type-dependent outside option.

JEL Classification: D82, D86**Keywords:** mechanism design; robust mechanism design; dominant-strategy mechanisms; maxmin foundation; linear programming; duality approach

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