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Info-Gap Robust-Satisficing and the Probability of Survival

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Abstract

Concepts of robustness are often employed when decisions under uncertainty are made without probabilistic information. We present a theorem which establishes necessary and sufficient conditions for non-probabilistic robustness to be equivalent to probability of success. When this “proxy property” holds, probability of success is enhanced (or maximized) by enhancing (or maximizing) robustness. Two further theorems establish important special cases. The proxy property implies that robustness has survival advantage over other strategies. This explains the prevalence of robust strategies in competition under uncertainty. Applications to foraging, forecasting, economics, Bayesian model mixing, and Ellsberg’s paradox of behavior under ambiguity are discussed.