

The sure-thing principle and independence of irrelevant knowledge

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Abstract

Savage (1954) introduced the sure-thing principle in terms of the dependence of decisions on knowledge, but gave up on formalizing it in epistemic terms for lack of a formal definition of knowledge. Using simple models of knowledge, we examine the sure-thing principle, presenting two ways to capture it. One is in terms of the *union* of future events, for which we reserve the original name - *the sure-thing principle*; the other is in terms of the *intersection* of *kens* - bodies of agents' knowledge - which we call *independence of irrelevant knowledge*. We show that the two principles are equivalent and that the only property of knowledge required for this equivalence is the axiom of truth - the requirement that whatever is known is true. We present a symmetric version of the independence of irrelevant knowledge which is equivalent to the impossibility of agreeing to disagree on the decision made by agents, namely the impossibility of agents making different decisions being common knowledge.