Title: EU Theory with Bounded Probability Nets

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Abstract : This paper develops an extension of expected utility theory. We introduce various new structures into the theory, which allow us to impose restrictions on them; e.g., probabilities are restricted having only decimal (or binary) expansion of finite depths, the preference relation in question may be incomplete. The classical EU theory can be regarded as a limit case. The basic idea for our extension is separation between measurement of utility for pure alternatives and extensions to lotteries involving risks such as plans for future events. These are formulated separated in an axiomatic manner: The measurement step is formulated by the first three axioms; and the extension step is formulated by the last axiom. Our theory coincides with the classical EU theory when no depth restrictions are given on permissible probabilities, but extension stops at some depths when depth restrictions are given. The latter case is our main concern. Our theory is in affinity with "bounded rationality", more precisely, satisficing and aspiration due to Simon. We exemplify one example due to Kahneman-Tversky in our theory.