Decision Making under Interval and Fuzzy Uncertainty:

Utility Approach

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ABSTRACT:

To make a decision, we must find out the user's preferences, and help the user select an alternative which is the best according to these preferences. A general way to describe user preferences is via the notion of utility: we select a very bad alternative $A_0$ and a very good alternative $A_1$; utility $u(A)$ of an alternative $A$ is then defined as the probability $p$ for which $A$ is equivalent to the lottery in which we get $A_1$ with probability $p$, and $A_0$ otherwise.

One can prove that utility is determined uniquely modulo linear re-scaling (corresponding to different choices of $A_0$ and $A_1$), and that the utility of a decision with probabilistic consequences is equal to the expected utility of these consequences. When do not know all the consequences of different decisions. In such cases, we get interval- (or fuzzy-) valued utilities and Hurwicz optimism-pessimism criterion.
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