Modeling Group Perceptions Using Stochastic Simulation: Scaling Issues in the Multiplicative AHP - DTU Orbit (04/10/2019)

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This paper proposes a new decision support approach for applying stochastic simulation to the multiplicative analytic hierarchy process (AHP) in order to deal with issues concerning the scale parameter. The paper suggests a new approach that captures the influence from the scale parameter by making use of probability distributions. Herein, the uncertainty both with regard to the scale and the inherent randomness from the parameter is captured by probabilistic input and output distributions. Provided that each alternative and criteria under consideration are independent it is assumed that the embedded uncertainty from the progression factors remains the same. The result is then an interval estimate for each alternative’s final scores. This can lead to overlapping intervals of scores which may be interpreted as possible rank reversals. Thus, the decision support approach makes it possible to calculate the probability of overlapping for any given set of pairwise comparisons.

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