# PROBABILISTIC JUDGMENTS SPECIFIED PARTIALLY IN ANALYTIC HIERARCHY PROCESS

**Indrani Basak and Prasanta Basak**
Pennsylvania State University
Altoona, PA 16601
i8b@psu.edu/fkv@psu.edu

Abstract: The Analytic Hierarchy Process (AHP) is a decision-making tool which yields priorities for the decision alternatives. This paper proposes a new approach to elicit and synthesize expert assessments for group decision process in AHP. These new elicitations are given as partial probabilistic specifications of the entries of pairwise comparisons matrices. For a particular entry of the matrix, the partial probabilistic elicitations could arise in the form of either probability assignments regarding the chance that entry falling in specified intervals or selected quantiles for that entry. A new class of models is introduced to provide methods for the processing of these partial probabilistic information. The advantage of this approach is that it allows to generate as many matrices of pairwise comparisons of the decision alternatives as one desires. This, in turn, allows to determine whether ranking of decision alternatives are statistically significant.