Inconsistency of pairwise comparisons matrices

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Abstract

This first part of the talk introduces the notions of distance-based triad and cycle inconsistency indices for pairwise comparisons. The conditions which should be satisfied by an inconsistency index to be distance-based will be analysed. Several examples of such indices will also be provided.

The second part of the talk presents a proof that the orthogonal projection of a pairwise comparison matrix onto the space of consistent matrices can be obtained as the quotients of the geometric means of its rows. This fact has been used to construct the greedy algorithm of the pairwise comparisons matrix's inconsistency reduction by stepwise corrections of the most inconsistent triads. During the entire process the geometric means of rows remain constant. Finally, another inconsistency reduction process, based on quadratic equations will be introduced. The results of a Monte Carlo experiment show that the convergence is quite fast.