MONTHLY WEBINAR ON PAIRWISE COMPARISON METHODS

Organized jointly by AGH University Cracow and Silesian University in Opava

The date: Thursday, February 27, at 18:00 (CET)

The Speaker: Dr. David Bartl (Silesian University in Opava, Czechia)

The title: A new nucleolus-like method to compute the priority vector of a pairwise comparison matrix

Abstract: We briefly recall several methods to find the priority vector of a pairwise comparison matrix (PCM), namely: arithmetic mean method (AMM), least squares method (LSM), chi-square method (CSM), logarithmic least squares method (LLSM) or geometric mean method (GMM), weighted least squares method (WLSM), and Saaty's eigenvector method (EVM). In this paper, we allow the PCM entries to be elements of a divisible alo-group (Abelian linearly ordered group), cf. the "general unified framework for pairwise comparison matrices in multicriteria methods" by Cavallo and D'Apuzzo (2009). Then, while most of the aforementioned methods, including Saaty's EVM, cannot be used in this setting due to their intrinsic properties, the GMM can easily be adapted to find the priority vector of the PCM with entries from a divisible alo-group (Cavallo & D'Apuzzo, 2012) and, to our best knowledge, is the only currently known method that can be used in this setting. We then recall the classical notion of a cooperative game with transferable utility, and also the classical solution concept of nucleolus (Schmeidler, 1969) of the TU-game. Inspired by the concept of nucleolus, we propose a new nucleolus-like method to compute the priority vector of a pairwise comparison matrix with entries from any divisible alo-group. The method utilizes the theory of linear programming in abstract spaces (Bartl, 2007).

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