

A review of “Advances in Pairwise Comparisons. Detection, Evaluation and Reduction of Inconsistency”. Recommendation on the appointment of dr. Jiri Mazurek as Associate Professor of Operations Research

This is a valuable book for all researchers working on decision-making methods, in particular those concerning multiple criteria. The author comprehensively reviews the literature on the different issues associated with inconsistency – a quite pervasive problem – in pairwise comparisons (PC), a very popular mechanism for analytical decision making. In addition, it presents the contribution of the author, which are novel and valuable.

The first chapter presents a brief history of PC methods. This is interesting, setting an appropriate context for the rest of the book. I miss though an initial discussion on why PC is useful: decomposing a complex decision-making problem into smaller parts that the human brain is able to deal with. I also miss a more extended description of the different problems addressed by the different researchers, so that readers would understand better the usefulness and relevance of the method. Although I understand that most readers of the book will be acquainted with this, I think it would have completed nicely this introduction, and make it more attractive to non-experts.

The second chapter goes deeper into a particular application of pairwise comparisons: multiplicative methods, in which preferences or judgements are considered multiplicative. The author explains how to measure consistency in PC, how different methods address the lack of consistency, and reflects upon possible causes.

I found particularly useful the section on the comparison of prioritization measures, since it offers a good summary of their pros and cons. Again, I find that an explanation of why inconsistent matrices create indetermination in the priority vector would have been useful for non-experts to understand the need to have prioritization methods, and their differences. The discussion of the scales of PC is also very informative, but scale normalization is a much more trivial issue in my opinion.

Finally, I find the note about the relationship between redundancy and inconsistency a bit lacking: yes, redundancy is indeed a possible cause for inconsistency, but there are many others that should have been discussed at least briefly.

The third chapter operationalizes this inconsistency into indices, reviewing the existing ones, and offering alternatives which solve some of the problems around these indices. The list of indices reviewed is impressive, but it is difficult to appreciate its value, since besides the analysis of their correlation (of which the author presents an interesting graph), and of their properties (which is indeed valuable), there is no comparison of the overall advantages or disadvantages of the indices. Some indications from the author beyond the descriptive analysis would have been appreciated.

Then, the fourth chapter looks at how to reduce inconsistency. Of course, an important issue here is whether this inconsistency should be reduced, and in that case, how. The author passes lightly over the first topic, and then reviews comprehensively the proposals made. There is also an interesting numerical comparison of some properties of some algorithms, although again I

miss a more critical discussion of results obtained (including e.g. cases in which one algorithm would be preferred to another).

Up to now, the author has covered the most common and useful issues around inconsistency in PC. However, the book goes even further. Although these final chapters are more specific, and maybe less interesting for most researchers, they do bring comprehensiveness to the assessment of the problem reviewed.

Chapter 5 looks at alternative approaches (other than indices) to evaluate inconsistency, describing the Condition of Order Preservation and how it is met in PC matrices; it also covers coherence conditions for additive PC matrices. This is a very interesting piece of work.

Chapter 6 looks at inconsistency in incomplete PC matrices, including a review of inconsistency indices for these matrices. This review is comprehensive and rigorous, but again lacking a qualitative discussion of the advantages and disadvantages of using incomplete PC matrices, of completing them, or of the inconsistency indices for them.

Finally, Chapter 7 looks at ordinal inconsistencies, which are very relevant in economics, in which cardinal preferences are not generally accepted. The contents of this chapter are also very valuable, in particular the discussion about ordinal-cardinal inconsistency thresholds, and about the relationship with the Condition of Order Preservation.

In the conclusions, the author mentions potential follow-ups, such as group decision-making, which is indeed a very relevant field for applying the techniques presented for the analysis of the consensus of groups.

The book is well written, easy to follow, and with many examples that facilitate understanding the concepts presented. The work is well referenced, and presented in a rigorous way. So, all in all, I find this a very valuable book for researchers in the topic. My only caveat, already mentioned above, is that it may be too succinct for non-experts, and lacking some qualitative discussions which would be useful to understand the application of the different techniques described.

Based on this assessment of the quality of the research presented, I think that the author shows good scholarly qualities, and a thorough knowledge of the topic. Therefore, I do recommend the appointment of dr. Mazurek as Associate Professor of Operations Research.



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