

A New Effective ABC Multicriteria Classification with AHP: How to Force Consistency of Pairwise Comparisons Matrix.

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Abstract: Multicriteria classification is usually a crucial step in the decision-making in manufacturing and purchasing management processes. But in such classification, both the attribution of weights to the criteria and the attribution of weights to the products according to each criterion strongly influence the coherence of the categorization. Saaty's Analytic Hierarchy Process (AHP) is an eminent method for assigning weights to multiple criteria. Yet, since criteria's pairwise comparison matrices are usually generated manually and based only on some employee know-how, there is high complexity in elaborating a consistent pairwise matrix, especially when comparing several criteria. The attribution of weights to the products according to each criterion is also a difficult task cause there is a need to balance all the quantitative values and the empirical values defined for the qualitative criteria. This article presents an efficient algorithm that can adjust inconsistent pairwise comparison matrices, a balancing procedure for attributing weights to the products according to qualitative criteria, and a new equation for ABC multicriteria classification. We tested the proposed solutions to companies in three sectors, demonstrating that this approach provided consistent results, according to the analysis of the company managers, being an essential resource for decision-making.

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3.1.1. Subsubsection

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Title 1	Title 2	Title 3
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The text continues here (Figure 2 and Table 2).



Figure 2. This is a wide figure.

Table 2. This is a wide table.

Title 1	Title 2	Title 3	Title 4
Entry 1 *	Data	Data	Data
	Data	Data	Data
	Data	Data	Data
Entry 2	Data	Data	Data
	Data	Data	Data
	Data	Data	Data
Entry 3	Data	Data	Data
	Data	Data	Data
	Data	Data	Data
Entry 4	Data	Data	Data
	Data	Data	Data
	Data	Data	Data

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Text.

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Text.

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3.3. *Formatting of Mathematical Components*

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This is the example 1 of equation:

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$$a = 1,$$

(1)

the text following an equation need not be a new paragraph. Please punctuate equations as regular text.

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This is the example 2 of equation:

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$$a = b + c + d + e + f + g + h + i + j + k + l + m + n + o + p + q + r + s + t + u + v + w + x + y + z$$

(2)

Please punctuate equations as regular text. Theorem-type environments (including propositions, lemmas, corollaries etc.) can be formatted as follows:

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Theorem 1. *Example text of a theorem.*

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The text continues here. Proofs must be formatted as follows:

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Abbreviations

The following abbreviations are used in this manuscript:

MDPI	Multidisciplinary Digital Publishing Institute
DOAJ	Directory of open access journals
TLA	Three letter acronym
LD	Linear dichroism

Appendix A147

Appendix A.1148

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Entry 1	Data	Data
Entry 2	Data	Data

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