@misc{Kulakowski2024mpib,

```
    title={My part is bigger than yours -- assessment within a group of
peers},
    author={Konrad Ku{\l}akowski and Jacek Szybowski},
    year={2024},
    eprint={2407.01843},
    archivePrefix={arXiv},
    primaryClass={cs.DM},
    url={https://arxiv.org/abs/2407.01843},
```

}

@article{Strada2024dodm,

```
abstract = {Most decision-making models, including the pairwise comparison
method, assume the honesty of the decision-maker. However, it is easy to
imagine a situation where the decision-maker tries to manipulate the ranking
results. This problem applies to many decision-making methods, including the
pairwise comparison method. This article proposes three simple algorithmic
methods for manipulating data using the pairwise comparison method. The
proposed solutions try to mimic the behavior of a dishonest decision-maker
who, acting under time pressure, chooses a simple strategy that leads to
pushing through a given alternative. We also test the susceptibility to
detection of the proposed manipulation strategies. To this end, we propose a
convolutional neural network architecture, which we train based on generated
data consisting of the original random pairwise comparison matrices and
their manipulated counterparts. Our approach treats the pairwise comparison
matrices as two- or three-dimensional images specific to the decision
situation. In the latter case, the matrices are initially transformed into a
three-dimensional map of local inconsistencies, and only data processed in
this way are subjected to analysis using neural networks. The experiments
indicate a significant level of detection of the proposed manipulations. In
numerical tests, the effectiveness of the presented solution ranges from 88%
to 100% effectiveness, depending on the tested algorithm and test
parameters. The measured average computation time for the single case
analyzed oscillated below one millisecond, which is a more than satisfactory
result of the performance of the built implementation. We can successfully
use the neural networks trained on synthetic data to detect manipulation
attempts carried out by real experts. Preliminary tests with respondents
also indicated high effectiveness in detecting manipulation. At the same
time, they signaled the difficulty of distinguishing actual manipulation
from a situation in which an expert strongly prefers one or more selected
alternatives.},
article-number = {8946},
author = {Strada, Micha{\l} and Ernst, Sebastian and Szybowski, Jacek and
Ku{\l}akowski, Konrad},
doi = {10.3390/app14198946},
issn = {2076-3417},
journal = {Applied Sciences},
number = {19},
```

```
title = {Detection of Decision-Making Manipulation in the Pairwise
Comparison Method},
url = {https://www.mdpi.com/2076-3417/14/19/8946},
volume = {14},
year = {2024},
bdsk-url-1 = {https://www.mdpi.com/2076-3417/14/19/8946},
bdsk-url-2 = {https://doi.org/10.3390/app14198946}}
```

@article{Szybowski2024aomo,

```
title = {Almost optimal manipulation of pairwise comparisons of
alternatives},
volume = {90},
ISSN = {1573-2916},
url = {http://dx.doi.org/10.1007/s10898-024-01391-3},
DOI = {10.1007/s10898-024-01391-3},
number = {1},
journal = {Journal of Global Optimization},
publisher = {Springer Science and Business Media LLC},
author = {Szybowski,  Jacek and Kułakowski,  Konrad and Ernst,  Sebastian},
year = {2024},
month = apr,
pages = {243–259}
```

}

@misc{szybowski2024establishing,

```
    title={Establishing a leader in a pairwise comparisons method},
    author={Jacek Szybowski and Konrad Kułakowski and Jiri Mazurek and
Sebastian Ernst},
    year={2024},
    eprint={2403.14885},
    archivePrefix={arXiv},
    primaryClass={cs.AI}
```

}

@article{Kulakowski2024rhao,

```
abstract = {In decision-making methods, it is common to assume that the
experts are honest and professional. However, this is not the case when one
or more experts in the pairwise-based group decision-making framework, such
as the group analytic hierarchy process, try to manipulate results in their
favor. This paper aims to introduce two heuristics enabling detection of
manipulators and minimizing their effect on the group consensus by
diminishing their weights. The first heuristic is based on the assumption
that manipulators will provide judgments that can be considered outliers
with respect to those of the other experts in the group. The second
heuristic assumes that dishonest judgments are less consistent than the
```

```
average consistency of the group. Both approaches are illustrated with
numerical examples and simulations.},
author = {Ku{\l}akowski, K. and Szybowski, J. and Mazurek, J. and Ernst,
S.},
date-added = {2023-12-08 15:23:55 +0100},
date-modified = {2023-12-08 15:24:32 +0100},
doi = {https://doi.org/10.1016/j.ins.2023.119979},
issn = {0020-0255},
journal = {Information Sciences},
keywords = {Pairwise comparisons, Manipulation, Group decision making,
Pairwise comparisons matrix, Analytic hierarchy process},
pages = {119979},
title = {Resilient heuristic aggregation of judgments in the pairwise
comparisons method},
url = {https://www.sciencedirect.com/science/article/pii/S0020025523015645},
volume = {657},
year = {2024}}
```

@article{Kedzior2023mchr,

```
abstract = {One of the most widespread multi-criteria decision-making
methods is the Analytic Hierarchy Process (AHP). AHP successfully combines
the pairwise comparisons method and the hierarchical approach. It allows the
decision-maker to set priorities for all ranked alternatives. But what if,
for some of them, their ranking value is known (e.g., it can be determined
differently)? The Heuristic Rating Estimation (HRE) method proposed in 2014
tried to bring the answer to this question. However, the considerations were
limited to a model only considering a few criteria. This work analyzes how
HRE can be used as part of the AHP hierarchical framework. The theoretical
considerations are accompanied by illustrative examples showing HRE as a
multiple-criteria decision-making method.},
article-number = {2806},
author = {K{\k e}dzior, Anna and Ku{\l}akowski, Konrad},
date-added = {2023-06-22 12:22:31 +0200},
date-modified = {2023-06-22 12:22:31 +0200},
doi = {10.3390/math11132806},
issn = {2227-7390},
journal = {Mathematics},
number = {13},
title = {Multiple-Criteria Heuristic Rating Estimation},
url = {https://www.mdpi.com/2227-7390/11/13/2806},
volume = {11},
year = {2023},
bdsk-url-1 = {https://www.mdpi.com/2227-7390/11/13/2806},
bdsk-url-2 = {https://doi.org/10.3390/math11132806}}
```

@misc{kulakowski2023tsjaArxiv,

```
    title={Towards secure judgments aggregation in AHP},
    author={Konrad Kułakowski and Jacek Szybowski and Jiri Mazurek and
Sebastian Ernst},
```

```
    year={2023},
    eprint={2303.15099},
    archivePrefix={arXiv},
    primaryClass={cs.AI}
```

}

@article{Szybowski2023aomoArxiv,

```
    title={Almost optimal manipulation of a pair of alternatives},
    author={Jacek Szybowski and Konrad Kułakowski and Sebastian Ernst},
    year={2023},
    journal = {accepted for publication in Journal of Global Optimization},
    eprint={2304.03060},
    archivePrefix={arXiv},
    primaryClass={cs.AI}
```

}

@article{Mazurek2022snot,

```
abstract = {This paper examines the differences in ordinal rankings obtained
from a pairwise comparison matrix using the eigenvalue method and the
geometric mean method. First, we introduce several propositions on the
(dis)similarity of both rankings concerning the matrix size and its
inconsistency expressed by the Koczkodaj's inconsistency index. Further on,
we examine the relationship between differences in both rankings and
Kendall's rank correlation coefficient τ and Spearman's rank coefficient ρ.
Apart from theoretical results, intuitive numerical examples and Monte Carlo
simulations are also provided.},
author = {Mazurek, J. and Kułakowski, K. and Ernst, S. and Strada, M.},
doi = {https://doi.org/10.1016/j.procs.2022.09.105},
issn = {1877-0509},
journal = {Procedia Computer Science},
keywords = {pairwise comparisons, Analytic Hierarchy Process, eigenvalue
method, geometric mean method, Kendall's tau, Spearman's rho, AHP, EVM,
GMM},
note = {Knowledge-Based and Intelligent Information & Engineering Systems:
Proceedings of the 26th International Conference KES2022},
pages = {504-513},
title = {Some Notes on the Similarity of Priority Vectors Derived by the
Eigenvalue Method and the Geometric Mean Method},
url = {https://www.sciencedirect.com/science/article/pii/S1877050922009863},
volume = {207},
year = {2022}}
```

@article{Kedzior2022mchr,

```
doi = {10.48550/ARXIV.2205.10428},
url = {https://arxiv.org/abs/2205.10428},
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author = {Kędzior, Anna and Kułakowski, Konrad},
keywords = {Artificial Intelligence (cs.AI), Discrete Mathematics (cs.DM),
FOS: Computer and information sciences, FOS: Computer and information
sciences},
title = {Multiple-criteria Heuristic Rating Estimation},
publisher = {arXiv},
year = {2022},
copyright = {arXiv.org perpetual, non-exclusive license}
```

}

@article{Kulakowski2022hrem,

```
doi = {10.48550/ARXIV.2207.10783},
url = {https://arxiv.org/abs/2207.10783},
author = {Kułakowski, Konrad and Kędzior, Anna},
keywords = {Artificial Intelligence (cs.AI), Discrete Mathematics (cs.DM),
FOS: Computer and information sciences, FOS: Computer and information
sciences},
title = {Heuristic Rating Estimation Method for the incomplete pairwise
comparisons matrices},
publisher = {arXiv},
year = {2022},
copyright = {arXiv.org perpetual, non-exclusive license}
```

}

@article{Mazurek2022otdo,

```
abstract = {In this paper, we propose a new method for the derivation of a
priority vector from an incomplete pairwise comparisons (PC) matrix. We
assume that each entry of a PC matrix provided by an expert is also
evaluated in terms of the expert's confidence in a particular judgment.
Then, from corresponding graph representations of a given PC matrix, all
spanning trees are found. For each spanning tree, a unique priority vector
is obtained with the weight corresponding to the confidence levels of
entries that constitute this tree. At the end, the final priority vector is
obtained through an aggregation of priority vectors achieved from all
spanning trees. Confidence levels are modeled by real (crisp) numbers and
triangular fuzzy numbers. Numerical examples and comparisons with other
methods are also provided. Last, but not least, we introduce a new formula
for an upper bound of the number of spanning trees, so that a decision maker
gains knowledge (in advance) on how computationally demanding the proposed
method is for a given PC matrix.},
author = {Jiri Mazurek and Konrad Ku{\l}akowski},
doi = {https://doi.org/10.1016/j.ijar.2022.08.014},
issn = {0888-613X},
journal = {International Journal of Approximate Reasoning},
keywords = {Pairwise comparisons, Fuzzy numbers, Priority vector, Spanning
tree, Multiple-criteria decision making},
pages = {242-257},
```

```
title = {On the derivation of weights from incomplete pairwise comparisons
matrices via spanning trees with crisp and fuzzy confidence levels},
url = {https://www.sciencedirect.com/science/article/pii/S0888613X22001268},
volume = {150},
year = {2022},
bdsk-url-1 =
{https://www.sciencedirect.com/science/article/pii/S0888613X22001268},
bdsk-url-2 = {https://doi.org/10.1016/j.ijar.2022.08.014}}
```

@Article{mazurek2021otdo,

```
    title={On the Derivation of Weights from Incomplete Pairwise Comparisons
Matrices via Spanning Trees with Crisp and Fuzzy Confidence Levels},
    author={Mazurek, J. and Kułakowski, K.},
    year={2021},
    eprint={2112.10253},
    archivePrefix={arXiv},
    primaryClass={math.OC},
    url={https://arxiv.org/abs/2112.10253}
```

}

@Article{Prusak2021taoa,

```
author = {Prusak, D. and Karpiel, G. and Kułakowski, K.},
title = {The Architecture of a Real-Time Control System for Heating Energy
Management in the Intelligent Building},
journal = {Energies},
volume = {14},
year = {2021},
number = {17},
article-number = {5402},
url = {https://www.mdpi.com/1996-1073/14/17/5402},
issn = {1996-1073},
abstract = {Very often, constructors and designers of intelligent building
and building automation systems have a choice: to create a compact system
with a limited configuration and modifying the system’s behavior
possibilities or provide a fully configurable solution at the expense of
introducing a full SCADA system equipped with an additional knowledge
database and inference system equipped with learning capabilities. In the
presented work, we show that there is a third solution. Using a multilayer
control system composed of programmable FPGAs, small PCs, and cloud
computing resources, we can design and implement a fully configurable
intelligent control system for the building’s heating. Our solution combines
the compactness of the structure and the ease of installation and
assembly.},
doi = {10.3390/en14175402}
```

}

@article{Urbaniec2021wseb,

```
author = {Urbaniec, M. and Sołtysik, M. and Prusak, A. and Kułakowski, K.
and Wojnarowska, M.},
title = {Fostering sustainable entrepreneurship by business strategies: An
explorative approach in the bioeconomy},
journal = {Business Strategy and the Environment},
pages = {},
      year  = {2021},
keywords = {analytic hierarchy process, bioeconomy, business strategy,
entrepreneurial discovery process, pairwise comparison, sustainable
development, sustainable, entrepreneurship},
doi = {https://doi.org/10.1002/bse.2885},
url = {https://onlinelibrary.wiley.com/doi/abs/10.1002/bse.2885},
eprint = {https://onlinelibrary.wiley.com/doi/pdf/10.1002/bse.2885},
abstract = {Abstract The conceptual framework of bioeconomy advances
sustainability by ensuring that environmental, social, and economic goals
are met. Although numerous authors perceive bioeconomy as a key sector to
achieve sustainable transformation, there is a lack of a comprehensive set
of factors determining sustainable entrepreneurship in the bioeconomy
sector. This study aims to identify factors influencing business strategies
for sustainable entrepreneurship in the bioeconomy sector. This study uses
the triangulation of research methods, including the entrepreneurial
discovery process, as well as multiple-criteria methods of the pairwise
comparison and the analytic hierarchy process. This study serves as grounds
for the identification of priority factors influencing the choice of
relevant business strategies in the bioeconomy. Within the framework of the
research, five core factors are specified: economic-and-financial, market,
technological, ecological, organization-and-human resources, and legal. The
findings reveal that the most significant factors are economic-and-financial
and market factors that determine the choice of innovative and offensive
strategies by bioeconomy enterprises. These strategies impact
entrepreneurial decision-making processes in the environmental and social
areas, and they contribute to the development of more sustainable and
entrepreneurial ecosystems. To advance the research on sustainable
entrepreneurship, different theoretical perspectives are combined, including
economics, strategic management, and innovation perspective.}
```

}

@article{kulakowski2021otsb,

```
author = {Konrad Kułakowski and Jiri Mazurek and Michał Strada},
title = {On the similarity between ranking vectors in the pairwise
comparison method},
journal = {Journal of the Operational Research Society},
volume = {0},
number = {0},
pages = {1-10},
year  = {2021},
publisher = {Taylor & Francis},
```

```
doi = {10.1080/01605682.2021.1947754},
URL = {https://doi.org/10.1080/01605682.2021.1947754},
eprint = {https://doi.org/10.1080/01605682.2021.1947754}

}
```

@inproceedings{Prusak2020apbr,

```
author = {Prusak, A. and Ku{\l}akowski, K. and Szybowski, J.},
booktitle = {Modelowanie preferencji a ryzyko '19--'20},
date-added = {2021-02-24 21:46:56 +0100},
date-modified = {2021-02-24 21:47:58 +0100},
title = {Analiza por{\'o}wnawcza badania ryzyka technologicznego w
projektach badawczo-rozwojowych przedsi{\k e}biorstw},
isbn = {978-83-7875-646-0},
year = {2020}}
```

@article{Mazurek2020sotc,

```
author = {Mazurek, J. and Ku{\l}akowski, K.},
date-added = {2020-11-19 16:03:20 +0100},
date-modified = {2020-11-19 16:08:38 +0100},
doi = {10.37190/ord200205},
journal = {Operations Research and Decisions},
number = {2},
pages = {77-89},
title = {Satisfaction of the condition of order preservation: A simulation
study.},
url =
{https://journals.indexcopernicus.com/search/article?articleId=2669489},
volume = {30},
year = {2020}}
```

@article{Kulakowski2020otsb,

```
author    = {Konrad Ku{\l}akowski and
             Jiří Mazurek and
             Michal Strada},
title     = {On the similarity between ranking vectors in the pairwise
comparison
             method},
journal   = {CoRR},
volume    = {abs/2010.04778},
year      = {2020},
url       = {https://arxiv.org/abs/2010.04778},
archivePrefix = {arXiv},
eprint    = {2010.04778},
timestamp = {Tue, 20 Oct 2020 15:08:10 +0200},
biburl    = {https://dblp.org/rec/journals/corr/abs-2010-04778.bib},
bibsource = {dblp computer science bibliography, https://dblp.org}
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```
}
```

@article{kulakowski2020otgm,

```
Author = {Ku{\l}akowski, Konrad},
Journal = {Mathematics},
Number = {1873},
Pages = {1-12},
Title = {On the Geometric Mean Method for Incomplete Pairwise Comparisons},
Volume = {8},
Year = {2020},
      url = {https://www.mdpi.com/2227-7390/8/11/1873},
      doi={https://doi.org/10.3390/math8111873}
```

```
}
```

@book{kulakowski2020uahp,

```
Author = {Konrad Ku{\l}akowski},
Date-Added = {2020-05-22 17:29:24 +0200},
Date-Modified = {2020-05-22 17:30:51 +0200},
Publisher = {Chapman & Hall, Taylor and Francis Group},
      doi={https://doi.org/10.1201/b21817},
      isbn={978-1-138-03232-3},
Series = {CRC Series in Operations Research},
Title = {Understanding The Analytic Hierarchy Process},
      url = {https://www.taylorfrancis.com/books/9781315392226},
Year = {2020}
```

```
}
```

@article{szybowski2000niif,

```
title = {New inconsistency indicators for incomplete pairwise comparisons
matrices},
journal = {Mathematical Social Sciences},
volume = {108},
pages = {138 - 145},
year = {2020},
issn = {0165-4896},
doi = {https://doi.org/10.1016/j.mathsocsci.2020.05.002},
url = {http://www.sciencedirect.com/science/article/pii/S016548962030055X},
author = Jacek Szybowski and Konrad Ku{\l}akowski and Anna Prusak},
keywords = {Decision making, Pairwise comparisons, Spanning trees},
abstract = {We introduce two new inconsistency measures for the incomplete
pairwise comparisons matrices and show several examples of their
calculation. We also carry out a comparative analysis of the new
inconsistency indices with the existing ones based on the Monte Carlo
simulation.}
```

```
}
```

@article{Kulakowski2020iifi,

```
Abstract = {Comparing alternatives in pairs is a very well known technique
of ranking creation. The answer to how reliable and trustworthy ranking
depends on the inconsistency of the data from which it was created. There
are many indices used for determining the level of inconsistency among
compared alternatives. Unfortunately, most of them assume that the set of
comparisons is complete, i.e. every single alternative is compared to each
other. This is not true and the ranking must sometimes be made based on
incomplete data. In order to fill this gap, this work aims to adapt several
existing inconsistency indices for the purpose of analyzing incomplete data
sets. The modified indices are subjected to Monte Carlo experiments. Those
of them that achieved the best results in the experiments carried out are
recommended for use in practice. },
Author = {Konrad Ku{\l}akowski and Dawid Talaga},
Doi = {10.1080/03081079.2020.1713116},
Eprint = {https://doi.org/10.1080/03081079.2020.1713116},
Journal = {International Journal of General Systems},
Number = {2},
Pages = {174-200},
Publisher = {Taylor & Francis},
Title = {Inconsistency indices for incomplete pairwise comparisons
matrices},
Url = {https://doi.org/10.1080/03081079.2020.1713116},
Volume = {49},
Year = {2020},
Bdsk-Url-1 = {https://doi.org/10.1080/03081079.2020.1713116}}
```

@article{Kulakowska2011mama,

```
Author = {Bodzoń-Ku{\l}akowska, A. and Ku{\l}akowski, K. and Drabik, A. and
Moszczynski, A. and Silberring, J. and Suder, P.},
Date-Added = {2012-10-27 22:49:16 +0000},
Date-Modified = {2015-10-01 12:15:41 +0000},
If2011 = {4.505},
Journal = {Proteomics},
Mnisw = {35},
Month = {January},
Number = {1},
Pages = {5--21},
Title = {{Morphinome--a meta-analysis applied to proteomics studies in
morphine dependence}},
Url = {http://www.ncbi.nlm.nih.gov/pubmed/21182190},
Volume = {11},
Year = {2011},
Bdsk-Url-1 = {http://www.ncbi.nlm.nih.gov/pubmed/21182190}}
```

@article{Christopher2019acip,

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    author = {Christopher, K. and Soltys, M. and Ku{\l}akowski, K.},
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    title = {"Approximating consistency in pairwise comparisons"},
    journal = {"Proceedia Computer Science"},
    year = {2019},
    pages = {1--10},
    url =
{https://www.sciencedirect.com/science/article/pii/S1877050919314279},
    doi = {https://doi.org/10.1016/j.procs.2019.09.240},
    month = apr

}
```

@article{KULAKOWSKI2019221,

```
    title = {"Towards quantification of incompleteness in the pairwise
comparisons methods"},
    journal = {"International Journal of Approximate Reasoning"},
    volume = {"115"},
    pages = {"221 - 234"},
    year = {"2019"},
    issn = {"0888-613X"},
    doi = {"https://doi.org/10.1016/j.ijar.2019.10.002"},
    url =
{"http://www.sciencedirect.com/science/article/pii/S0888613X19301197"},
    author = {"Konrad Ku{\l}akowski and Jacek Szybowski and Anna Prusak"},
    keywords = {"Decision analysis, Pairwise comparisons, Incompleteness,
Data quality, AHP"},
    abstract = {"Apart from consistency, the completeness of information is
one of the key factors influencing data quality. In the case of the pairwise
comparisons (PC) method, much space in the literature is devoted to the
quantitative analysis of this first idea, while the second issue has not
been properly studied. The presented article is an attempt to bridge this
gap. The aim of the article is to examine how the incompleteness of a set of
paired comparisons influences the sensitivity of the PC method. During the
research, two important factors related to the incompleteness of PC matrices
have been identified, namely the number of missing pairwise comparisons and
their arrangements. Accordingly, an easy-to-calculate incompleteness index
have been developed. It takes into account both the total number of missing
data and their distribution in the PC matrix. During the series of
Montecarlo experiments, the properties of this index have been examined. It
demonstrated that both the incompleteness and inconsistency of data almost
equally contribute to the sensitivity of the PC matrix. The relative
simplicity of the proposed index may help decision makers to quickly
estimate the impact of missing comparisons on the quality of final
results."}
```

}

@article{kulakowski2019otgm,

```
author    = {Konrad Ku{\l}akowski},
title     = {On the geometric mean method for incomplete pairwise
```

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comparisons},
journal   = {CoRR},
volume    = {abs/1905.04609},
year      = {2019},
url       = {https://arxiv.org/abs/1905.04609},
archivePrefix = {arXiv},
eprint    = {1905.04609}
```

}

@article{kulakowski2019iifi,

```
author    = {Konrad Ku{\l}akowski and
             Dawid Talaga},
title     = {Inconsistency indices for incomplete pairwise comparisons
matrices},
journal   = {CoRR},
volume    = {abs/1903.11873},
year      = {2019},
url       = {http://arxiv.org/abs/1903.11873},
archivePrefix = {arXiv},
eprint    = {1903.11873},
timestamp = {Tue, 02 Apr 2019 11:16:55 +0200},
biburl    = {https://dblp.org/rec/bib/journals/corr/abs-1903-11873},
bibsource = {dblp computer science bibliography, https://dblp.org}
```

}

@article{Kulakowski2018tqoi,

```
author    = {Konrad Ku{\l}akowski and
             Anna Prusak and
             Jacek Szybowski},
title     = {Towards quantification of incompleteness in the pairwise
comparisons
             method},
journal   = {CoRR},
volume    = {abs/1812.03589},
year      = {2018},
url       = {http://arxiv.org/abs/1812.03589},
archivePrefix = {arXiv},
eprint    = {1812.03589},
timestamp = {Tue, 01 Jan 2019 15:01:25 +0100},
biburl    = {https://dblp.org/rec/bib/journals/corr/abs-1812-03589},
bibsource = {dblp computer science bibliography, https://dblp.org}
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}

@article{Kulakowski2019witc, title = „When is the condition of order preservation met?”, journal = „European Journal of Operational Research”, volume = „277”, number = „1”, pages = „248 - 254”, year = „2019”, issn = „0377-2217”, doi = „https://doi.org/10.1016/j.ejor.2019.01.046”, url =

„http://www.sciencedirect.com/science/article/pii/S0377221719300815”, author = „Konrad Ku\l{}akowski and Jiří Mazurek and Jaroslav Ramík and Michael Soltys”, keywords = „Decision analysis, Pairwise comparisons, Alo-groups, COP, AHP”, abstract = „This article explores the relationship between inconsistency in the pairwise comparisons method and conditions of order preservation. A pairwise comparisons matrix with elements from an alo-group (an Abelian, linearly ordered group) is investigated. This approach allows for a generalization of previous results. Sufficient conditions for order preservation based on the properties of elements of pairwise comparisons matrix are derived. Elucidating numerical examples are presented.” }

@article{BodzonKulakowska2019mdtd,

```
Abstract = {Morphine is considered a gold standard in pain treatment.
Nevertheless, its use could be associated with severe side effects,
including drug addiction. Thus, it is very important to understand the
molecular mechanism of morphine action in order to develop new methods of
pain therapy, or at least to attenuate the side effects of opioids usage.
Proteomics allows for the indication of proteins involved in certain
biological processes, but the number of items identified in a single study
is usually overwhelming. Thus, researchers face the difficult problem of
choosing the proteins which are really important for the investigated
processes and worth further studies. Therefore, based on the 29 published
articles, we created a database of proteins regulated by morphine
administration -- The Morphinome Database (addiction-proteomics.org). This
web tool allows for indicating proteins that were identified during
different proteomics studies. Moreover, the collection and organization of
such a vast amount of data allows us to find the same proteins that were
identified in various studies and to create their ranking, based on the
frequency of their identification. STRING and KEGG databases indicated
metabolic pathways which those molecules are involved in. This means that
those molecular pathways seem to be strongly affected by morphine
administration and could be important targets for further investigations.
```

Significance The data about proteins identified by different proteomics studies of molecular changes caused by morphine administration (29 published articles) were gathered in the Morphinome Database. Unification of those data allowed for the identification of proteins that were indicated several times by distinct proteomics studies, which means that they seem to be very well verified and important for the entire process. Those proteins might be now considered promising aims for more detailed studies of their role in the molecular mechanism of morphine action.},

```
Author = {Anna Bodzon-Kulakowska and Tereza Padrtova and Anna Drabik and
Joanna Ner-Kluza and Anna Antolak and Konrad Kulakowski and Piotr Suder},
Date-Modified = {2019-02-11 19:41:19 +0100},
Doi = {https://doi.org/10.1016/j.jprot.2018.04.013},
Issn = {1874-3919},
Journal = {Journal of Proteomics},
Keywords = {Morphine, Morphinome, Proteome, Database, Meta-analysis,
Proteins, Metabolic pathways, Bioinformatics},
Note = {Proteomics in chronic pain; investigating mechanistic markers of
pain},
Pages = {21 - 26},
Title = {Morphinome Database -- The database of proteins altered by morphine
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```
administration -- An update},
Url = {http://www.sciencedirect.com/science/article/pii/S1874391918301714},
Volume = {190},
Year = {2019},
Bdsk-Url-1 =
{http://www.sciencedirect.com/science/article/pii/S1874391918301714},
Bdsk-Url-2 = {https://doi.org/10.1016/j.jprot.2018.04.013}}
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@article{Kulakowski2018wcoo,

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author    = {Konrad Ku{\l}akowski and
             Jiri Mazurek and
             Jaroslav Ramik and
             Michael Soltys},
title     = {When condition of order preservation is met?},
journal   = {CoRR},
volume    = {abs/1802.02397},
year      = {2018},
url       = {http://arxiv.org/abs/1802.02397},
archivePrefix = {arXiv},
eprint    = {1802.02397},
timestamp = {Thu, 01 Mar 2018 15:00:45 +0100},
biburl    = {https://dblp.org/rec/bib/journals/corr/abs-1802-02397},
bibsource = {dblp computer science bibliography, https://dblp.org}
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}

@article{Kulakowski2018iito,

```
Abstract = {Comparing alternatives in pairs is a well-known method used to
create ranking. Experts are asked to perform a series of binary comparisons
and then, using mathematical methods, the final ranking is constructed.
Experts conduct a series of single assessments, however, they may not always
be consistent. The level of inconsistency among individual assessments is
widely accepted as a measure of the ranking quality. The higher the ranking
quality, the higher its credibility. One of the earliest and most widespread
inconsistency indices is the consistency coefficient defined by Kendall and
Babington Smith. In their work, the authors consider binary pairwise
comparisons, i.e., those where the result of an individual comparison can
only be better or worse. In the presented work, the maximal number of
inconsistent triads in the set of ordinal pairwise comparisons with ties of
arbitrary size is determined (formula 14). This, in turn, opens the
possibility of effectively extending the Kendall and Babington Smith index
to pairwise comparisons, where the result of an individual comparison can
be: better, worse or equal. Hence, this effectively extends the use of this
index to the Analytic Hierarchy Process and other quantitative methods based
on comparing alternatives in pairs. The work also introduces the notions of
a generalized tournament and a double tournament as graphs that model
ordinal pairwise comparisons with ties and the maximally inconsistent set of
pairwise comparisons with ties, respectively. The relationship between the
```

```
most inconsistent set of pairwise comparisons with ties and the set cover
problem is also shown.},
Author = {Konrad Ku{\l}akowski},
Date-Modified = {2019-02-11 19:52:53 +0100},
Doi = {https://doi.org/10.1016/j.ejor.2018.03.024},
Issn = {0377-2217},
Journal = {European Journal of Operational Research},
Keywords = {Decision support systems, Pairwise comparisons, Inconsistency,
AHP, Set cover problem},
Number = {1},
Pages = {314 - 327},
Title = {Inconsistency in the ordinal pairwise comparisons method with and
without ties},
Url = {http://www.sciencedirect.com/science/article/pii/S0377221718302522},
Volume = {270},
Year = {2018},
Bdsk-Url-1 =
{http://www.sciencedirect.com/science/article/pii/S0377221718302522},
Bdsk-Url-2 = {https://doi.org/10.1016/j.ejor.2018.03.024}}
```

@article{Kulakowski2017iito,

```
author    = {Ku{\l}akowski, Konrad},
title     = {Inconsistency in the ordinal pairwise comparisons method with
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             without ties},
journal   = {CoRR},
volume    = {abs/1702.01126},
year      = {2017},
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```

}

@Inbook{Kulakowski2016srot,

```
      author={Ku{\l}akowski, Konrad
              and Kędzior, Anna},
      editor={Nguyen, Ngoc-Thanh
              and Iliadis, Lazaros
              and Manolopoulos, Yannis
              and Trawi{\'{n}}ski, Bogdan},
      title={Some Remarks on the Mean-Based Prioritization Methods in AHP},
      bookTitle={Computational Collective Intelligence: 8th International
Conference, ICCCI 2016, Halkidiki, Greece, September 28-30, 2016.
Proceedings, Part I},
      year={2016},
      publisher={Springer International Publishing},
      pages={434--443},
      isbn={978-3-319-45243-2},
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```

```
      url={http://dx.doi.org/10.1007/978-3-319-45243-2_40}

}

@article{Saaty2016aota,

author    = {Thomas L. Saaty and
             Ku{\l}akowski, Konrad},
title     = {Axioms of the Analytic Hierarchy Process {(AHP)} and its
Generalization
             to Dependence and Feedback: The Analytic Network Process
{(ANP)}},
journal   = {CoRR},
volume    = {abs/1605.05777},
year      = {2016},
url       = {http://arxiv.org/abs/1605.05777},
timestamp = {Wed, 01 Jun 2016 15:51:08 +0200},
biburl    = {http://dblp.uni-trier.de/rec/bib/journals/corr/SaatyK16}

}

@article{Janicki2016tapo,

Author = {Janicki, R. and Ku{\l}akowski, K.},
Date-Added = {2016-05-04 22:53:29 +0000},
Date-Modified = {2016-05-04 22:55:35 +0000},
Journal = {Fundamenta Informaticae},
Number = {3-4},
Pages = {i-iii},
Title = {Theory and Practice of Pairwise Comparisons:  Preface},
      url =
{http://content.iospress.com/journals/fundamenta-informaticae/144/3-4},
Volume = {144},
Year = {2016}}

@article{Kulakowski2015dcve,

author    = {Konrad Kulakowski},
title     = {Dynamic concurrent van Emde Boas array},
journal   = {CoRR},
volume    = {abs/1509.06948},
year      = {2015},
url       = {http://arxiv.org/abs/1509.06948},
timestamp = {Thu, 01 Oct 2015 14:28:48 +0200},
biburl    = {http://dblp.uni-trier.de/rec/bib/journals/corr/Kulakowski15},
bibsource = {dblp computer science bibliography, http://dblp.org}

}

@InProceedings{Kostrzewa2006apat,
```

```
title = "A practical approach to the modelling, visualising and executing of
reactive systems",
booktitle = "MIXed DESign of integrated circuits and systems",
author = "Kostrzewa, M. and Ku{\l}akowski, K.",
year = "2006",
pages = "705--710"
```

}

@article{Koczkodaj2014otqe,

```
Author = {Koczkodaj, W. W. and Ku{\l}akowski, K. and Lig{\k e}za, A.},
Date-Added = {2014-05-22 17:00:40 +0000},
Date-Modified = {2014-11-18 13:04:05 +0000},
Doi = {10.1007/s11192-014-1258-y},
Issn = {0138-9130},
Journal = {Scientometrics},
Keywords = {Pairwise comparisons; Inconsistency analysis; Expert opinion;
Academic entity quality; Performance evaluation},
Language = {English},
Number = {3},
Pages = {911-926},
Publisher = {Springer Netherlands},
Title = {{On the quality evaluation of scientific entities in Poland
supported by consistency-driven pairwise comparisons method}},
Url = {http://dx.doi.org/10.1007/s11192-014-1258-y},
Volume = {99},
Year = {2014},
Bdsk-Url-1 = {http://dx.doi.org/10.1007/s11192-014-1258-y}}
```

@incollection{Baran2014anom,

```
Author = {Baran, M. and Ku{\l}akowski, K. and Lig{\k e}za, A.},
Booktitle = {Artificial Intelligence and Soft Computing},
Date-Added = {2015-09-16 16:11:58 +0000},
Date-Modified = {2015-09-16 16:11:58 +0000},
Doi = {10.1007/978-3-319-07176-3_3},
Editor = {Rutkowski, Leszek and Korytkowski, Marcin and Scherer, Rafa{\l}
and Tadeusiewicz, Ryszard and Zadeh, LotfiA. and Zurada, JacekM.},
Isbn = {978-3-319-07175-6},
Language = {English},
Pages = {27-39},
Publisher = {Springer International Publishing},
Series = {Lecture Notes in Computer Science},
Title = {A Note on Machine Learning Approach to Analyze the Results of
Pairwise Comparison Based Parametric Evaluation of Research Units},
Url = {http://dx.doi.org/10.1007/978-3-319-07176-3_3},
Volume = {8468},
Year = {2014},
Bdsk-Url-1 = {http://dx.doi.org/10.1007/978-3-319-07176-3_3}}
```

@inproceedings{Kulakowski2001pmaz,

```
Author = {Ku{\l}akowski, K.},
Booktitle = {Systemy czasu rzeczywistego},
Date-Added = {2015-09-29 17:10:56 +0000},
Date-Modified = {2015-09-29 17:10:56 +0000},
Title = {Problemy modelowania agentowego zorientowanych system{\'o}w
zdecentralizowanych},
Year = {2001}}
```

@article{Kulakowski2002mgaa,

```
Abstract = {Autorzy: , K. Tytul: Music Grammars. An analysis of Transitions
as a Method of Music Pattern Recognition. Czasopismo: Schedae },
Author = {Ku{\l}akowski, K.},
Date-Added = {2010-01-10 18:23:43 +0100},
Date-Modified = {2010-01-10 18:27:18 +0100},
Journal = {Schedae Informaticae},
Month = {Jan},
Rating = {0},
Title = {{Music Grammars. An analysis of Transitions as a Method of Music
Pattern Recognition}},
Uri = {papers://4DDF0B57-C826-41E2-8F25-83309340F068/Paper/p1308},
Url =
{http://baztech.icm.edu.pl/baztech/cgi-bin/btgetdoc.cgi?BUJ1-0016-0035},
Year = {2002},
Bdsk-Url-1 =
{http://baztech.icm.edu.pl/baztech/cgi-bin/btgetdoc.cgi?BUJ1-0016-0035}}
```

@inproceedings{Kulakowski2002wzpz,

```
Author = {Ku{\l}akowski, K.},
Booktitle = {Systemy Czasu Rzeczywistego SCR'02},
Date-Added = {2015-09-28 19:47:39 +0000},
Date-Modified = {2015-10-29 17:32:30 +0000},
Organization = {Instytut Informatyki Politechniki {\'S}l{\k a}skiej},
Title = {{Weryfikacja zgodno{\'s}ci projektu ze specyfikacj{\k a} z
wykorzystaniem sieci Petriego i Algebry Proces{\'o}w CCS}},
Year = {2002}}
```

@inproceedings{kulakowski2005rtjp,

```
Author = {Ku{\l}akowski, K.},
Booktitle = {Systemy czasu rzeczywistego (SCR)},
Date-Added = {2012-10-27 11:55:40 +0000},
Date-Modified = {2015-09-28 19:38:03 +0000},
Title = {Real-time Java -- Platforma Programistyczna Dla System{\'o}w Czasu
Rzeczywistego},
Year = {2005}}
```

@inproceedings{Kulakowski2006hamv,

```
Added-At = {2009-10-28T00:00:00.000+0100},
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Biburl =
{http://www.bibsonomy.org/bibtex/2b315725d544338906fce6c110dea3bad/dblp},
Booktitle = {SET},
Crossref = {conf/ifip2/2006},
Date = {2009-10-28},
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Keywords = {dblp},
Pages = {121-126},
Publisher = {Springer},
Series = {IFIP},
Timestamp = {2009-10-28T00:00:00.000+0100},
Title = {{Hybrid modeling and verification of Java based software.}},
Url = {http://dblp.uni-trier.de/db/conf/ifip2/set2006.html#Kulakowski06},
Volume = 227,
Year = 2006,
Bdsk-Url-1 =
{http://dblp.uni-trier.de/db/conf/ifip2/set2006.html#Kulakowski06}}
```

@inproceedings{Kulakowski2006mhsr,

```
Author = {Ku{\l}akowski, K.},
Booktitle = {Systemy informatyczne z ograniczeniami czasowymi},
Date-Added = {2012-10-27 13:04:02 +0000},
Date-Modified = {2012-10-27 13:11:07 +0000},
Title = {Hybrid modeling of reactive systems with Petri nets and CCS process
algebra},
Year = {2006}}
```

@inproceedings{Kulakowski2006tfdo,

```
Author = {Ku{\l}akowski, K.},
Booktitle = {Systemy informatyczne z ograniczeniami czasowymi},
Date-Added = {2012-10-27 13:11:41 +0000},
Date-Modified = {2012-10-27 13:32:20 +0000},
Title = {{Towards facilitating development of reactive systems software
based on Real Time Java}},
Year = {2006}}
```

@inproceedings{Kulakowski2006wtos,

```
Author = {Ku{\l}akowski, K. and Kostrzewa, M.},
Booktitle = {Systemy informatyczne z ograniczeniami czasowymi},
Date-Added = {2015-09-28 19:58:41 +0000},
Date-Modified = {2015-09-28 20:00:19 +0000},
Publisher = {WK{\L} Wydawnictwa Komunikacji i {\L}{\k a}czno{\'s}ci},
Title = {Wspomaganie tworzenia oprogramowania system{\'o}w reaktywnych w
Real Time Java},
Year = {2006}}
```

@incollection{Kulakowski2007hmav,

```
Author = {Ku{\l}akowski, K.},
Booktitle = {Software Engineering Techniques: Design for Quality},
Date-Added = {2013-11-13 17:11:58 +0000},
Date-Modified = {2015-11-06 01:19:39 +0000},
Doi = {10.1007/978-0-387-39388-9_12},
Editor = {Sacha, Krzysztof},
Isbn = {978-0-387-39387-2},
Pages = {121-126},
Publisher = {Springer US},
Series = {IFIP International Federation for Information Processing},
Title = {Hybrid modeling and verification of Java based software},
Volume = {227},
Wos = {idx},
Year = {2007},
Bdsk-Url-1 = {http://dx.doi.org/10.1007/978-0-387-39388-9_12}}
```

@InProceedings{Was2009msip, author={W{\k a}s, J. and Ku{\l}akowski, K.}, editor={Nguyen, Ngoc Thanh and Kowalczyk, Ryszard and Chen, Shyi-Ming}, title={Multi-agent Systems in Pedestrian Dynamics Modeling}, booktitle={Computational Collective Intelligence. Semantic Web, Social Networks and Multiagent Systems}, year={2009}, publisher={Springer Berlin Heidelberg}, address={Berlin, Heidelberg}, pages={294–300}, abstract={The article presents the use of Multi-agent system (MAS) in pedestrian dynamics modeling. Current trends in pedestrian dynamics are presented with particular focus on a short review of various agent-based models of pedestrian dynamics. The models are briefly discussed and compared.}, isbn={978-3-642-04441-0} }

@article{Kulakowski2008aarm,

```
Author = {Ku{\l}akowski, K. and W{\k a}s, J. and Szpyrka, M.},
Date-Added = {2015-09-28 17:21:31 +0000},
Date-Modified = {2015-09-28 17:28:58 +0000},
Journal = {Automatyka},
Mnisw2008 = {4},
Title = {{Architektura autonomicznego robota mobilnego z dynamicznym modelem
{\'s}wiata}},
Year = {2008}}
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@article{kulakowski2008dmsw,

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Affiliation = {Institute of Automatics, University of Science and
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Technology, AGH},
Author = {Ku{\l}akowski, K. and W{\k a}s, J. and Szpyrka, M.},
Date-Added = {2010-03-26 18:46:11 +0100},
Date-Modified = {2015-09-28 17:31:20 +0000},
Journal = {Automatyka},
Mnisw2008 = {4},
Rating = {0},
Title = {Dynamiczny model {\'s}wiata w sterowaniu autonomicznym robotem
mobilnym},
Year = {2008},
Bdsk-Url-1 =
{http://vtls.cyf-kr.edu.pl/cgi-bin/abc-k/chameleon?sessionid=200912311035240
2916&skin=abc-
k&lng=pl&inst=consortium&host=localhost%252B9898%252BDEFAULT&search=KEYWORD&
function=INITREQ&SourceScreen=NEXTPAGE&elementcount=1&t1=Ku%25C5%2582akowski
,%2520Konrad%2520(1975-
%2520).&u1=1003&pos=1&rootsearch=FREEFORM&beginsrch=1#}}
```

@article{Kulakowski2008mscr,

```
Author = {Ku{\l}akowski, K and Kostrzewa, M},
Date-Added = {2015-09-28 17:39:40 +0000},
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Journal = {Automatyka},
Mnisw2008 = {4},
Title = {{Modelowanie system{\'o}w czasu rzeczywistego w UML}},
Year = {2008}}
```

@inproceedings{Kulakowski2008rpor,

```
Author = {Kulakowski, K. and Kostrzewa, M.},
Booktitle = {{Proceedings of International Conference on Signals and
Electronic Systems, 2008. ICSES '08. }},
Date-Added = {2015-09-26 12:39:40 +0000},
Date-Modified = {2015-09-26 13:03:00 +0000},
Doi = {10.1109/ICSES.2008.4673443},
Keywords = {program testing;real-time systems;software architecture;software
prototyping;software tools;UML;development stage;executable modelling;model
driven architecture;rapid prototyping;reactive appliance toolkit;real-time
Java;real-time reactive systems;software designing;software engineering
methods;software simulation;software testing;software tools;Computer
architecture;Home appliances;Prototypes;Real time systems;Software
engineering;Software prototyping;Software testing;Software tools;Time
factors;Unified modeling language;MDA;RAT;Reacive Systems;Real-Time
Systems;UML},
Month = {Sept},
Pages = {381-384},
Title = {Rapid prototyping of real-time reactive systems},
Wos = {idx},
Year = {2008},
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```
Bdsk-Url-1 = {http://dx.doi.org/10.1109/ICSES.2008.4673443}}
```

@InProceedings{Kulakowski2007mscr,

```
title = "Modelowanie Systemów Czasu Rzeczywistego w UML",
author = "Konrad Ku{\l}akowski and Marek Kostrzewa",
      booktitle = "Seminarium wyjazdowe KA w Lublinie",
year = "2007",
```

}

@article{Kulakowski2008uusd,

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Author = {Ku{\l}akowski, K. and Nalepa, G. J.},
Date-Added = {2010-01-10 18:23:43 +0100},
Date-Modified = {2015-09-28 19:46:27 +0000},
Journal = {In proceedings of IMCSIT},
Rating = {0},
Title = {{Using UML State Diagrams for Visual Modeling of Business Rules}},
Wos = {idx},
Year = {2008},
Bdsk-Url-1 = {http://www.proceedings2008.imcsit.org/pliks/96.pdf}}
```

@inproceedings{Kulakowski2009asmd,

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Author = {Ku{\l}akowski, K. and W{\k a}s, J.},
Booktitle = {Automatyka},
Date-Added = {2012-10-27 20:28:51 +0000},
Date-Modified = {2015-09-28 17:33:20 +0000},
Mnisw2009 = {4},
Title = {Architektura systemu modelowania dynamiki pieszych},
Year = {2009}}
```

@article{Kulakowski2009rmkm,

```
Author = {Kulakowski, K.},
Date-Added = {2012-10-27 20:37:04 +0000},
Date-Modified = {2015-09-28 19:38:30 +0000},
Journal = {Automatyka},
Mnisw2009 = {4},
Title = {Robust -- model komunikacji Mindstorms NXT-PC},
Year = {2009}}
```

@InProceedings{Was2010aaie, author={W{\k a}s, J. and Ku{\l}akowski, K.}, editor={J{\k{e}}drzejowicz, Piotr and Nguyen, Ngoc Thanh and Howlet, Robert J. and Jain, Lakhmi C.}, title={Agent-Based Approach in Evacuation Modeling}, booktitle={Agent and Multi-Agent Systems: Technologies and Applications}, year={2010}, publisher={Springer Berlin Heidelberg}, address={Berlin, Heidelberg}, pages={325–330}, abstract={The article presents an agent-based approach to modeling of pedestrian evacuation. It includes some theoretical aspect of using the agents techniques as well as case study of evacuation tests realized by the authors. Results from real

data gained from experiments are compared with data from designed simulations. The use of agent-based methods gives promising perspective in pedestrian evacuation modeling.},
isbn={978-3-642-13480-7} }

@inproceedings{Kulakowski2009tjbi,

```
Abstract = {The concept of intelligent control system architecture is not a
new idea. The reference
```

architectures of such systems were proposed and broadly discussed in the late 80s and 90s of the twentieth century. Unfortunately, many authors either focus on the general scheme of this class of systems without a clear implementation perspective, or implement some solutions without precisely defined designs. The aim of this article is to propose a design for intelligent control system. Theoretical discussion is supplemented by implementation remarks. The current state of our prototype implementation of intelligent control system is also presented. In order to propose some design principles of such systems, existing models and ap- proaches are briefly reviewed and discussed. },

```
Affiliation = {AGH UST},
Author = {Ku{\l}akowski, K.},
Booktitle = {Proceedings of International Joint Conference Intelligent
Information Systems},
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Date-Modified = {2015-09-28 19:40:31 +0000},
Editor = {Leonard Bolc},
Isbn = {978-83-60434-59-8.},
Mnisw2009 = {7},
Month = {Jun},
Pages = {531-540},
Publisher = {EXIT},
Rating = {5},
Series = {Challenging Problems of Science. Computer Science},
Title = {{Towards Java-based Intelligent Control Architecture}},
Year = {2009}}
```

@article{Kulakowski2009wsaa,

```
Author = {Ku{\l}akowski, K. and Mouaddib, A.},
Date-Added = {2015-09-28 19:49:20 +0000},
Date-Modified = {2015-09-28 19:51:03 +0000},
Journal = {CSL Technical Raport 2/2009},
Title = {What situation awareness and distributed robotics have in common?},
Year = {2009}}
```

@inproceedings{Kulakowski2010acwm,

```
Author = {Ku{\l}akowski, K. and W{\k a}s, J.},
Booktitle = {{Proceedings of Intelligent Information Systems, Siedlce,
Poland}},
Date-Added = {2010-05-16 21:41:33 +0200},
Date-Modified = {2015-09-28 20:40:35 +0000},
```

```
Mnisw2010 = {7},
Pages = {{37-45}},
Title = {{World model for autonomous mobile robot -- formal approach}},
Year = {2010}}
```

@inproceedings{Kulakowski2010ccpa,

```
Author = {Ku{\l}akowski, K.},
Booktitle = {Agent and Multi-Agent Systems: Technologies and Applications},
Date-Added = {2012-05-31 17:30:13 +0000},
Date-Modified = {2015-09-28 20:13:07 +0000},
Editor = {Jedrzejowicz, Piotr and Nguyen, Ngoc and Howlet, Robert and Jain,
Lakhmi},
Mnisw2010 = {13},
Series = {Lecture Notes in Computer Science},
Title = {{cljRobust - Clojure Programming API for Lego Mindstorms NXT}},
Volume = {6071},
Wos = {idx},
Year = {2010}}
```

@inbook{Kulakowski2010etrs,

```
Author = {Rzucid{\l}o, J. and Ku{\l}akowski, K.},
Date-Added = {2012-10-27 20:57:16 +0000},
Date-Modified = {2015-09-28 20:21:42 +0000},
Journal = {Information systems architecture and technology : system analysis
approach to the design, control and decision support},
Mnisw2010 = {7},
Publisher = {Wroc{\l}aw University of Technology. --- Wroc{\l}aw : Oficyna
Wydawnicza Politechniki Wroc{\l}awskiej},
Title = {Explorer -- the robust search robot},
Year = {2010}}
```

@inproceedings{Kulakowski2010tcao,

```
Author = {Ku{\l}akowski, K. and W{\k a}s, J.},
Booktitle = {Parallel Processing and Applied Mathematics},
Date-Added = {2015-05-18 11:39:59 +0000},
Date-Modified = {2015-09-28 19:42:51 +0000},
Editor = {Wyrzykowski, R. and Dongarra, J. and Karczewski, K. and
Wa{\'s}niewski, J.},
Mnisw2010 = {13},
Pages = {529-538},
Publisher = {Springer},
Series = {Lecture Notes in Computer Science},
Title = {{Two Concurrent Algorithms of Discrete Potential Field
Construction}},
Volume = {6068},
Wos = {idx},
Year = {2010}}
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@inproceedings{Kulakowski2010rtrm,

```
Abstract = {In recent years, increased interest in the design of intelligent
mobile  has been visible. Although building such constructions from scratch
requires knowl- edge of many different disciplines, such as mechanics,
electronics or computer science, there are now many },
Author = {Ku{\l}akowski, K. and Matyasik, P.},
Booktitle = {{Simulation, Modeling, and Programming for Autonomous Robots}},
Date-Added = {2010-12-08 16:35:09 +0100},
Date-Modified = {2015-09-28 20:33:25 +0000},
Editor = {Ando, Noriaki and Balakirsky, Stephen and Hemker, Thomas and
Reggiani, Monica and von Stryk, Oskar},
Mnisw2010 = {13},
Publisher = {Springer Verlag},
Rating = {0},
Series = {Lecture Notes in Computer Science},
Title = {{RobustHX - The Robust Middleware Library for Hexor Robots}},
Uri = {http://link.springer.com/chapter/10.1007%2F978-3-642-17319-6_24},
Volume = {6472},
Wos = {idx},
Year = {2010},
Bdsk-Url-1 = {http://www.springerlink.com/index/WR5721180R3737R4.pdf}}
```

@inbook{Kulakowski2010sefm,

```
Author = {Ku{\l}akowski, K. and W{\k a}s, J. and Topa, P.},
Booktitle = {Intelligent Information Systems : new approaches},
Date-Added = {2012-10-27 21:22:45 +0000},
Date-Modified = {2015-09-28 20:36:30 +0000},
Mnisw2010 = {7},
Publisher = {Publishing House of University of Podlasie},
Title = {Simulation environment for modeling pedestrian dynamics},
Year = {2010}}
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@inproceedings{Kulakowski2011dwmw,

```
Address = {Berlin, Heidelberg},
Author = {Ku{\l}akowski, K and St{\k{e}}pie{\'{n}}, T.},
Booktitle = {Agent and Multi-Agent Systems: Technologies and Applications},
Date-Added = {2015-05-18 11:37:19 +0000},
Date-Modified = {2015-09-28 20:20:46 +0000},
Edition = {Lecture Notes in Computer Science},
Editor = {Hutchison, D. and Kanade, T. and Kittler, J. and Kleinberg, J. M.
and Mattern, F. and Mitchell, J. C. and Naor, M. and Nierstrasz, O. and
Pandu R., C. and Steffen, B. and Sudan, M. and Terzopoulos, D. and Tygar, D.
and Vardi, M. Y. and Weikum, G. and O{\textquoteright}Shea, J. and Nguyen,
N. T. and Crockett, K. and Howlett, R. J. and Jain, L. C.},
Mnisw2012 = {10},
Pages = {190-199},
Publisher = {Springer},
Series = {Lecture Notes in Computer Science},
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Title = {{Dynamic World Model with the Lazy Potential Function}},
Volume = {6682},
Wos = {idx},
Year = {2011}}
```

@inbook{Kulakowski2011rwbs,

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Author = {Ku{\l}akowski, K.},
Date-Added = {2012-10-27 22:42:38 +0000},
Date-Modified = {2015-09-28 20:35:38 +0000},
Mnisw2012 = {5},
Publisher = {PAR Pomiary Automatyka Robotyka},
Title = {Robust -- wsp{\'o}{\l}bie{\.z}na biblioteka sterowania robotem
mobilnym},
Year = {2011}}
```

@inproceedings{Kulakowski2012CCLS,

```
Author = {Ku{\l}akowski, K.},
Booktitle = {proceedings of Dependability and Complex Systems DepCoS},
Date-Added = {2012-02-23 18:27:39 +0000},
Date-Modified = {2015-09-28 20:11:27 +0000},
Mnisw2012 = {5},
Title = {{CCL Sim, the simulation environment for concurrent systems}},
Year = {2012}}
```

@article{Kulakowski2012csmw,

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Author = {Ku{\l}akowski, K.},
Date-Added = {2012-10-27 23:02:48 +0000},
Date-Modified = {2015-09-28 20:17:27 +0000},
Journal = {Automatyka},
Title = {{Concurrent systems modeling with CCL}},
Url =
{http://journals.bg.agh.edu.pl/AUTOMAT/2012.16.2/automat.2012.16.2.115.pdf},
Year = {2012},
Bdsk-Url-1 =
{http://journals.bg.agh.edu.pl/AUTOMAT/2012.16.2/automat.2012.16.2.115.pdf}}
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@incollection{Kulakowski2012mrbw,

```
Author = {Ku{\l}akowski, K. and Szmuc, T.},
Booktitle = {Simulation, Modeling, and Programming for Autonomous Robots},
Date-Added = {2015-09-26 17:21:48 +0000},
Date-Modified = {2015-09-26 17:34:10 +0000},
Doi = {10.1007/978-3-642-34327-8_7},
Editor = {Noda, Itsuki and Ando, Noriaki and Brugali, Davide and Kuffner,
JamesJ.},
Isbn = {978-3-642-34326-1},
Language = {English},
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Pages = {40-51},
Publisher = {Springer Berlin Heidelberg},
Series = {Lecture Notes in Computer Science},
Title = {{Modeling Robot Behavior with CCL}},
Url = {http://dx.doi.org/10.1007/978-3-642-34327-8_7},
Volume = {7628},
Year = {2012},
Bdsk-Url-1 = {http://dx.doi.org/10.1007/978-3-642-34327-8_7}}
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@article{Kulakowski2013cba,

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Author = {Ku{\l}akowski, K.},
Bibsource = {dblp computer science bibliography, http://dblp.org},
Biburl = {http://dblp.uni-trier.de/rec/bib/journals/corr/Kulakowski13a},
Date-Added = {2015-05-15 18:12:25 +0000},
Date-Modified = {2015-05-15 18:12:44 +0000},
Journal = {CoRR},
Timestamp = {Tue, 03 Dec 2013 15:04:24 +0100},
Title = {Concurrent bisimulation algorithm},
Url = {http://arxiv.org/abs/1311.7635},
Volume = {abs/1311.7635},
Year = {2013},
Bdsk-Url-1 = {http://arxiv.org/abs/1311.7635}}
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@article{Kulakowski2013nodi,

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Author = {Ku{\l}akowski, K.},
Bibsource = {DBLP, http://dblp.uni-trier.de},
Date-Added = {2014-01-27 12:52:20 +0000},
Date-Modified = {2015-02-10 16:49:25 +0000},
Ee = {http://arxiv.org/abs/1312.2986},
Journal = {CoRR (Submitted to EJOR)},
Title = {Notes on discrepancy in the pairwise comparisons method},
Volume = {abs/1312.2986},
Year = {2013}}
```

@techreport{kulakowski2013oocn,

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Author = {Ku{\l}akowski, K. and Szmuc, T.},
Date-Added = {2012-12-08 16:51:57 +0000},
Date-Modified = {2013-04-08 21:48:20 +0000},
Institution = {AGH University of Science and Technology},
Title = {Outline of {CCL} notation syntax},
Url = {http://winntbg.bg.agh.edu.pl/csl/dacstr-1-2013.pdf},
Year = {2013},
Bdsk-Url-1 = {http://winntbg.bg.agh.edu.pl/csl/dacstr-1-2013.pdf}}
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@inproceedings{Kulakowski2013rpts,

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Author = {Ku{\l}akowski, K. and Matyasik, P.},
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Bibsource = {DBLP, http://dblp.uni-trier.de},
Booktitle = {Multiagent System Technologies MATES},
Date-Added = {2013-10-19 11:24:00 +0000},
Date-Modified = {2015-09-26 17:07:07 +0000},
Editor = {Klusch, M. and Thimm, M. and Paprzycki, M.},
Ee = {http://dx.doi.org/10.1007/978-3-642-40776-5_12},
Pages = {115-123},
Publisher = {Springer},
Series = {Lecture Notes in Computer Science},
Title = {{Robust PI - The Simulation Robust Library Component for Pioneer
3DX}},
Volume = {8076},
Year = {2013}}
```

@article{Kulakowski2014acve,

```
Abstract = {Increasing demand for computationally efficient algorithms and
processors has turned the attention of researchers toward parallel and
concurrent solutions. Because the frequency of contemporary processors
cannot be tweaked infinitely, the only hopes for squeezing more performance
from computers are parallel processing and parallel computation. The
important part of every parallel solution is concurrent data structures,
which allow multithread programming environments to be taken advantage of.
In this article, a new concurrent dynamic set structure is proposed. It is
based on the van Emde Boas trees concept, where on every node of a tree, an
array of the node's children is stored. The structure is equipped with a
simple but effective locking algorithm, which allows it to be used
concurrently by any number of threads. The presented algorithm idea is
accompanied by an experimental implementation written in JAVA 6. Preliminary
tests prove that, especially for moderately larger data sets with a
predominance of read operations, the concurrent van Emde Boas array proposed
in this article may be a viable alternative for other structures providing a
similar functionality. Copyright {\copyright} 2013 John Wiley & Sons, Ltd.},
Author = {Ku{\l}akowski, K.},
Date-Added = {2014-05-22 16:54:16 +0000},
Date-Modified = {2015-09-28 16:57:46 +0000},
Doi = {10.1002/cpe.2995},
If2014 = {0.997},
Issn = {1532-0634},
Journal = {Concurrency and Computation: Practice and Experience},
Keywords = {concurrent objects, concurrent programming},
Mnisw = {25},
Number = {2},
Pages = {360--379},
Title = {{A concurrent van Emde Boas array as a fast and simple concurrent
dynamic set alternative}},
Url = {http://dx.doi.org/10.1002/cpe.2995},
Volume = {26},
Year = {2014},
Bdsk-Url-1 = {http://dx.doi.org/10.1002/cpe.2995}}
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@article{Kulakowski2014hrea,

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Author = {Ku{\l}akowski, K.},
Bibsource = {DBLP, http://dblp.uni-trier.de},
Date-Added = {2015-09-16 16:04:58 +0000},
Date-Modified = {2015-09-16 16:04:58 +0000},
Doi = {10.3233/FI-2014-1081},
Journal = {Fundamenta Informaticae},
Pages = {367-386},
Title = {{Heuristic Rating Estimation Approach to The Pairwise Comparisons
Method}},
Url =
{http://content.iospress.com/articles/fundamenta-informaticae/fi133-4-03},
Volume = {133},
Year = {2014},
Bdsk-Url-1 = {http://dx.doi.org/10.3233/FI-2014-1081}}
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@article{Kulakowski2014mili,

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Acmid = {2561407},
Address = {Tarrytown, NY, USA},
Author = {Ku{\l}akowski, K. and Matyasik, P. and Ernst, S.},
Date-Added = {2015-05-15 18:04:44 +0000},
Date-Modified = {2015-09-26 18:03:12 +0000},
Doi = {10.1016/j.eswa.2013.06.065},
If2014 = {2.24},
Issn = {0957-4174},
Issue_Date = {March, 2014},
Journal = {Expert Syst. Appl.},
Keywords = {Behavior modeling, Formal methods, Intelligent robots for
construction, Lighting measurements},
Month = mar,
Number = {4},
Numpages = {6},
Pages = {984--989},
Publisher = {Pergamon Press, Inc.},
Title = {Modeling Indoor Lighting Inspection Robot Behavior Using Concurrent
Communicating Lists},
Url = {http://dx.doi.org/10.1016/j.eswa.2013.06.065},
Volume = {41},
Year = {2014},
Bdsk-Url-1 = {http://dx.doi.org/10.1016/j.eswa.2013.06.065}}
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@article{Kulakowski2014tntb,

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Abstract = {Abstract Pairwise comparisons are widely recognized method
supporting decision making process based on the subjective judgments. The
key to this method is the notion of inconsistency that has a significant
impact on the reliability of results. Inconsistency is expressed by means of
inconsistency indices. Depending on their construction, such indices may pay
attention to different aspects of the set of pairwise comparisons. The
```

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family of indices proposed in this article tries to combine the advantages
coming from different indices, thereby increases the expressiveness of the
family elements. The newly introduced notion of equivalence can help in
comparing the indices and identifying their common properties. },
Author = {Ku{\l}akowski, K. and Szybowski, J.},
Date-Added = {2014-11-14 17:36:57 +0000},
Date-Modified = {2014-11-16 00:27:21 +0000},
Doi = {http://dx.doi.org/10.1016/j.procs.2014.08.205},
Issn = {1877-0509},
Journal = {Procedia Computer Science},
Number = {0},
Pages = {1132 - 1137},
Title = {The New Triad based Inconsistency Indices for Pairwise
Comparisons},
Url = {http://www.sciencedirect.com/science/article/pii/S1877050914011703},
Volume = {35},
Year = {2014},
Bdsk-Url-1 =
{http://www.sciencedirect.com/science/article/pii/S1877050914011703},
Bdsk-Url-2 = {http://dx.doi.org/10.1016/j.procs.2014.08.205}}
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@article{Kulakowski2014twst,

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Author = {Ku{\l}akowski, K. and Szybowski, J. and Tadeusiewicz, R.},
Date-Added = {2014-09-23 14:08:26 +0000},
Date-Modified = {2014-09-23 15:02:06 +0000},
Journal = {Procedia Computer Science},
Pages = {1122--1131},
Title = {{Tender with Success {\textendash} The Pairwise Comparisons
Approach}},
Volume = {35},
Year = {2014}}
```

@inproceedings{Kulakowski2015acir,

```
Author = {Ku{\l}akowski, K. and Juszczyk, R. and Ernst, S.},
Booktitle = {Artificial Intelligence and Soft Computing},
Date-Added = {2015-05-18 08:08:29 +0000},
Date-Modified = {2015-05-18 08:11:55 +0000},
Journal = {Lecture Notes in Computer Science},
Number = {9120},
Pages = {214--222},
Title = {A Concurrent Inconsistency Reduction Algorithm for the Pairwise
Comparisons Method`},
Volume = {II},
Year = {2015}}
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@article{Kulakowski2015ahre,

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Author = {Ku{\l}akowski, K.},
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Date-Added = {2015-09-28 15:03:09 +0000},
Date-Modified = {2015-09-28 15:03:09 +0000},
Doi = {10.1007/s10100-013-0311-x},
If2014 = {0.832},
Issn = {1435-246X},
Journal = {Central European Journal of Operations Research},
Keywords = {Decision analysis; Pairwise comparisons; Iterative algorithms;
Data inconsistency},
Language = {English},
Mnisw = {20},
Number = {1},
Pages = {187-203},
Publisher = {Springer-Verlag},
Title = {A heuristic rating estimation algorithm for the pairwise
comparisons method},
Url = {http://dx.doi.org/10.1007/s10100-013-0311-x},
Volume = {23},
Year = {2015},
Bdsk-Url-1 = {http://dx.doi.org/10.1007/s10100-013-0311-x}}
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@article{Kulakowski2015etah,

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Author = {Ku{\l}akowski, K.},
Date-Added = {2015-05-15 20:04:37 +0000},
Date-Modified = {2015-09-27 01:35:47 +0000},
Doi = {10.1007/s10100-015-0396-5},
If2014 = {0.832},
Issn = {1435-246X},
Journal = {Central European Journal of Operations Research},
Language = {English},
Pages = {1-3},
Publisher = {Springer Berlin Heidelberg},
Title = {Erratum to: A heuristic rating estimation algorithm for the
pairwise comparisons method},
Url = {http://dx.doi.org/10.1007/s10100-015-0396-5},
Year = {2015},
Bdsk-Url-1 = {http://dx.doi.org/10.1007/s10100-015-0396-5}}
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@article{Kulakowski2015hreg,

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Author = {Ku{\l}akowski, K. and Grobler-D{\k e}bska, K. and W{\k a}s, J.},
Date-Added = {2015-09-16 15:56:46 +0000},
Date-Modified = {2015-09-16 15:57:28 +0000},
Doi = {10.1007/s10898-014-0253-4},
Issn = {0925-5001},
Journal = {Journal of Global Optimization},
Keywords = {Multicriteria analysis; Pairwise comparisons; Ranking theory;
AHP; Logarithmic least square method},
Language = {English},
Number = {3},
Pages = {529-543},
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Publisher = {Springer US},
Title = {Heuristic rating estimation: geometric approach},
Url = {http://dx.doi.org/10.1007/s10898-014-0253-4},
Volume = {62},
Year = {2015},
Bdsk-Url-1 = {http://dx.doi.org/10.1007/s10898-014-0253-4}}
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@article{Kulakowski2015noop,

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Author = {Ku{\l}akowski, K.},
Date-Added = {2015-03-06 17:20:18 +0000},
Date-Modified = {2015-09-16 16:07:53 +0000},
Doi = {10.1016/j.ejor.2015.03.010},
Journal = {European Journal of Operational Research},
Number = {1},
Pages = {333--337},
Publisher = {Elsevier},
Title = {{Notes on Order Preservation and Consistency in AHP}},
Url = {http://dx.doi.org/10.1016/j.ejor.2015.03.010},
Volume = {245},
Year = {2015},
Bdsk-Url-1 = {http://dx.doi.org/10.1016/j.ejor.2015.03.010}}
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@Article{Kulakowski2016note, author={Ku{\l}akowski, Konrad}, title={Notes on the existence of a solution in the pairwise comparisons method using the heuristic rating estimation approach}, journal={Annals of Mathematics and Artificial Intelligence}, year={2016}, volume={77}, number={1}, pages={105–121}, abstract={Pairwise comparisons (PC) is a well-known method for modeling the subjective preferences of a decision maker. The method is very often used in the models of voting systems, social choice theory, decision techniques (such as AHP - Analytic Hierarchy Process) or multi-agent AI systems. In this approach, a set of paired comparisons is transformed into one overall ranking of alternatives. Very often, only the results of individual comparisons are given, whilst the weights (indicators of significance) of the alternatives need to be computed. According to Heuristic Rating Estimation (HRE), the new approach discussed in the article, besides the results of comparisons, the weights of some alternatives can also be a priori known. Although HRE uses a similar method to the popular AHP technique to compute the weights of individual alternatives, the solution obtained is not always positive and real. This article tries to answer the question of when such a correct solution exists. Hence, the sufficient condition for the existence of a positive and real solution in the HRE approach is formulated and proven. The influence of inconsistency in the paired comparisons set for the existence of a solution is also discussed.}, issn={1573-7470}, doi={10.1007/s10472-015-9474-6}, url={http://dx.doi.org/10.1007/s10472-015-9474-6} }

@article{Kulakowski2015otpo,

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Author = {Ku{\l}akowski, K.},
Date-Added = {2015-05-17 22:18:44 +0000},
Date-Modified = {2015-07-28 13:31:09 +0000},
Doi = {10.3233/FI-2015-1240},
Journal = {Fundamenta Informaticae},
Keywords = {AHP, Heuristic Rating Estimation, Pairwise Comparisons, Decision
Systems},
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Month = {July},
Number = {4},
Pages = {403 - 419},
Title = {On the Properties of the Priority Deriving Procedure in the
Pairwise Comparisons Method},
Volume = {139},
Year = {2015},
Bdsk-Url-1 = {http://dx.doi.org/10.3233/FI-2015-1200}}
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