**An MCDA Model To Rank Alternatives That Does Not Use Weights**

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**Abstract**

A set of ranking problems that have a truth model is used to test the accuracy of the weighted sum model (WSM). WSM is found to generate rankings that correlate poorly, and sometimes randomly, with the truth model, no matter the choice of weights.

The Intrinsic Value (IVAL) model, a multi criteria decision analysis (MCDA) model that does not use weighting factors, was thus developed. Rather than using weights, IVAL mimics the human decision-making thought process. Correlation of IVAL with the truth model is exceptional (0.95 – .99+) in all cases examined.

Because there are no weights, there is no need with IVAL for pairwise comparison or other complex processes that generate relative weights. For example, there is no need for a structure like House of Quality, used in Quality Function Deployment (QFD).

Because IVAL ratings have such high fidelity, techniques to improve initial outcomes, such as backscatter, used in deep neural networks, may not be necessary.

The IVAL model easily incorporates criteria dependencies and hierarchical processes. It requires only very simple code that could easily replace just the WSM portion of code used in many current MCDA models. It would be interesting to see the results of doing this.

**Keywords**

criterion space

multi criteria decision analysis (MCDA)

multiple criteria hierarchy

ranking process

utility function

weighted sum model (WSM)

**Graphical Abstract**

<https://github.com/matrixbud/Multi-Criteria-Decision-Analysis-MCDA-/blob/main/GraphicalAbstract1.jpg>

1. Author has no institutional affiliations. The work was accomplished alone, at home, at 4509 Knoll Ridge Dr, Fort Worth, TX 76008, and received no funding. A precursor of the IVAL model was developed at home and then used at Lockheed Martin Aerospace Co. The author did not reference or build upon any published work. The author reports there are no competing interests to declare. The author does not use social media including Facebook, Twitter, and Linkedin. Supporting data is available at the author’s github web page along with the graphical abstract. Some equations were written in MathType, the former standard for Microsoft Word but which is no longer (properly) supported. [↑](#footnote-ref-1)