

Salo, Ahti A.; Hämäläinen, Raimo P.

On the measurement of preferences in the analytic hierarchy process (with remarks and comments and rejoinder). (English) [Zbl 1078.91525](#)

J. Multi-Criteria Decis. Anal. 6, No. 6, 309-343 (1997).

Summary: In this paper we apply multiattribute value theory as a framework for examining the use of pairwise comparisons in the analytic hierarchy process (AHP). On one hand our analysis indicates that pairwise comparisons should be understood in terms of preference differences between pairs of alternatives. On the other hand it points out undesirable effects caused by the upper bound and the discretization of any given ratio scale. Both these observations apply equally well to the SMART procedure which also uses estimates of weight ratios. Furthermore, we demonstrate that the AHP can be modified so as to produce results similar to those of multiattribute value measurement; we also propose new balanced scales to improve the sensitivity of the AHP ratio scales. Finally we show that the so-called supermatrix technique does not eliminate the rank reversal phenomenon which can be attributed to the normalizations in the AHP.

MSC:

[91B10](#) Group preferences

[91B06](#) Decision theory

[90B50](#) Management decision making, including multiple objectives

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[hierarchical weighting](#); [analytic hierarchy process](#); [multiattribute value measurement](#); [ratio scales](#)

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