UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

THE SELECTION OF MACHINE TOOLS USING FUZZY WEAK AUTOCATALYTIC SET
(P43S23)

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ABSTRACT

Pairwise comparison is commonly used in decision-making, especially in dealing with Multiple Criteria Decision Making (MCDM) problems. This study focuses on exploring effective techniques for decision-making. The Analytic Hierarchy Process (AHP) is effective but may face transparency issues, and the Potential Method (PM) is limited in handling fuzzy boundaries due to its binary nature. On the other hand, FWACS, which includes elements of graph theory and fuzziness, is introduced. The study has two main goals: 1) Apply the Fuzzy Weak Autocatalytic Set (FWACS) technique to a machine selection problem, sourced from Farhan et al. (2016). 2) Compare the results of FWACS with those from AHP and PM. The study begins with the application of the FWACS technique, followed by the representation of a fuzzy graph through a comparative evaluation of a set of alternatives. Then, a comprehensive comparison of outcomes is conducted among FWACS, AHP, and PM. The results from FWACS demonstrate stability and consistency, aligning with the outcomes from both AHP and PM. In conclusion, FWACS is emphasized for its effectiveness in tackling machine selection problems and can further be applied to decision-making involving multiple criteria.