

SKRIPSI

**APLIKASI BILANGAN FUZZY Z DAN METODE CODAS Z-FUZZY
DALAM PENGAMBILAN KEPUTUSAN MULTIKRITERIA (STUDI
KASUS: EVALUASI KINERJA PROGRAM STUDI DI FAKULTAS SAINS
DAN MATEMATIKA UNIVERSITAS DIPONEGORO)**

***APPLICATION OF FUZZY Z-NUMBERS AND CODAS Z-FUZZY METHOD
IN MULTI-CRITERIA DECISION MAKING (CASE STUDY: DEPARTMENT
PERFORMANCE EVALUATION IN THE FACULTY OF SCIENCE AND
MATHEMATICS, DIPONEGORO UNIVERSITY)***



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**DEPARTEMEN MATEMATIKA
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UNIVERSITAS DIPONEGORO
SEMARANG**

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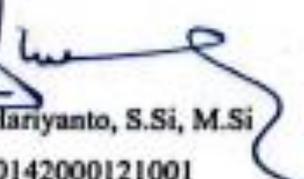


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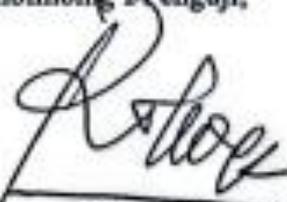
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ABSTRAK

APLIKASI BILANGAN FUZZY Z DAN METODE CODAS Z-FUZZY DALAM PENGAMBILAN KEPUTUSAN MULTIKRITERIA (STUDI KASUS: EVALUASI KINERJA JURUSAN DI FAKULTAS SAINS DAN MATEMATIKA UNIVERSITAS DIPONEGORO)

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Pengambilan keputusan seringkali melibatkan berbagai pilihan alternatif dan kriteria evaluasi secara bersamaan, serta diekspresikan dalam bahasa alami yang bersifat subjektif dan tidak pasti. Dengan demikian, kombinasi metode Combinative Distance-Based Assessment (CODAS) dan bilangan fuzzy Z menghasilkan metode CODAS Z-Fuzzy menawarkan pendekatan dalam pengambilan keputusan kompleks berbasis data linguistik. CODAS memanfaatkan jarak Euclidean dan Taxicab dengan membandingkan jaraknya dari solusi ideal negatif, sementara bilangan fuzzy Z tidak hanya merepresentasikan nilai suatu keputusan tetapi juga tingkat kepercayaannya. Metode ini diterapkan untuk mengevaluasi kinerja enam jurusan di Fakultas Sains dan Matematika, Universitas Diponegoro, yaitu Matematika, Kimia, Fisika, Biologi/Bioteknologi, Statistika, dan Informatika. Evaluasi dilakukan berdasarkan lima kriteria utama, yaitu Sarana dan Prasarana, Kurikulum dan Pembelajaran, Penelitian dan Publikasi, Suasana Kemahasiswaan, serta Akreditasi dan Reputasi. Hasil perhitungan menunjukkan jurusan Kimia menempati peringkat tertinggi berdasarkan metode CODAS Z-Fuzzy, sedangkan jurusan Matematika berada pada posisi terendah. Perbandingan dengan metode Z-Fuzzy konvensional menunjukkan peringkat tertinggi diperoleh jurusan Informatika dan posisi terendah diperoleh jurusan Biologi. Adanya perbedaan hasil peringkat mengindikasikan bahwa pendekatan berbasis jarak relatif dalam CODAS Z-Fuzzy lebih sensitif terhadap perbedaan antar alternatif.

Kata kunci: Pengambilan keputusan multikriteria, bilangan fuzzy Z, CODAS Z-Fuzzy, evaluasi kinerja jurusan, Universitas Diponegoro

ABSTRACT

APPLICATION OF FUZZY Z-NUMBERS AND CODAS Z-FUZZY METHOD IN MULTI-CRITERIA DECISION MAKING (CASE STUDY: DEPARTMENT PERFORMANCE EVALUATION IN THE FACULTY OF SCIENCE AND MATHEMATICS, DIPONEGORO UNIVERSITY)

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Decision-making processes frequently involve the evaluation of multiple alternatives across diverse criteria, and such evaluations are often expressed through natural language, which inherently contains subjectivity and uncertainty. Therefore, the integration of the Combinative Distance-Based Assessment (CODAS) method with Z-number theory yields the CODAS Z-Fuzzy approach—a robust framework for handling linguistic data in multi-criteria decision-making (MCDM). The CODAS method incorporates both Euclidean and Taxicab distances to assess the relative position of each alternative from the negative ideal solution, while Z-numbers represent not only the core value of a judgment but also the associated degree of reliability. This study applies the CODAS Z-Fuzzy method to evaluate the performance of six departments within the Faculty of Science and Mathematics at Universitas Diponegoro, comprising Mathematics, Chemistry, Physics, Biology/Biotechnology, Statistics, and Informatics. The assessment is conducted based on five principal criteria: Facilities and Infrastructure, Curriculum and Instruction, Research and Publication, Student Academic Environment, and Accreditation and Reputation. The results indicate that the Chemistry department achieved the highest ranking using the CODAS Z-Fuzzy method, while the Mathematics department ranked lowest. In contrast, the conventional Z-Fuzzy method identified the Informatics department as the top performer and the Biology department as the least performing. The observed discrepancies in rankings highlight the increased sensitivity of the CODAS Z-Fuzzy method in capturing subtle differences among alternatives due to its distance-based analytical structure. These findings underscore the potential of CODAS Z-Fuzzy as an effective decision-support tool in environments characterized by imprecise and uncertain information.

Keywords: Multi-Criteria Decision Making (MCDM), Fuzzy Z-Numbers, CODAS Z-Fuzzy, Department Performance Evaluation, Universitas Diponegoro