RINGKASAN

Masalah transportasi merupakan model optimasi dalam program linear yang bertujuan meminimumkan biaya distribusi dari beberapa sumber ke beberapa tujuan. Penelitian ini bertujuan menganalisis kinerja *Vogel's Approximation Method* (VAM) dan *Modified Vogel's Approximation Method* (MVAM) dalam memperoleh solusi awal serta mencapai solusi optimal pada masalah transportasi. Data yang digunakan adalah distribusi Beras untuk Rumah Tangga Miskin (Raskin) pada Perum BULOG Sub Divre Makassar Tahun 2016 yang dikembangkan menjadi empat skenario dengan kondisi *balanced* dan *unbalanced*.

Penelitian menggunakan pendekatan kuantitatif berbasis simulasi komputasional. Solusi awal diperoleh menggunakan *VAM* dan *MVAM*, sedangkan kondisi *unbalanced* diseimbangkan melalui penambahan variabel *dummy*. Optimalitas solusi dievaluasi menggunakan metode *Stepping Stone*. Seluruh proses perhitungan dilakukan dengan bantuan *Google Colab*.

Hasil penelitian menunjukkan bahwa kinerja *VAM* dan *MVAM* bergantung pada karakteristik data. *VAM* memberikan solusi lebih baik pada Skenario 1, Skenario 2, dan Skenario 3, *MVAM* pada Skenario 4. Pengujian dengan *Stepping Stone* menunjukkan bahwa seluruh solusi telah optimal atau memerlukan sedikit iterasi untuk mencapai biaya minimum. Penambahan variabel *dummy* turut memengaruhi pola alokasi dan proses penyelesaian pada kondisi *unbalanced*. Secara keseluruhan, *VAM* dan *MVAM* efektif digunakan dalam menyelesaikan masalah transportasi, dengan tingkat efisiensi yang dipengaruhi oleh struktur biaya dan keseimbangan antara *supply* dan *demand*.

Kata kunci: masalah transportasi, *VAM, MVAM, Stepping Stone*, Raskin.

SUMMARY

The transportation problem is an optimization model in linear programming aimed at minimizing distribution costs from multiple sources to multiple destinations. This study aims to analyze the performance of Vogel's Approximation Method (VAM) and the Modified Vogel's Approximation Method (MVAM) in obtaining initial basic feasible solutions and reaching optimal solutions for transportation problems. The data utilized is the distribution of Rice for Poor Households (Raskin) at Perum BULOG Sub Divre Makassar in 2016, which was developed into four scenarios involving balanced and unbalanced *conditions.*

This study employs a quantitative approach based on computational simulation. The initial solutions were obtained using VAM and MVAM, while the unbalanced condition was resolved by introducing a dummy variable. The optimality of the solutions was evaluated using the Stepping Stone method. The entire calculation process was conducted using Google Colab.

The results indicate that the performance of VAM and MVAM depends on data characteristics. VAM provided better initial solutions in Scenario 1, Scenario 2, and Scenario 3, whereas MVAM performed better in Scenario 4. Testing with the Stepping Stone method demonstrated that all solutions were already optimal or required minimal iterations to achieve the minimum cost. The introduction of the dummy variable also influenced the allocation patterns and the resolution process under unbalanced conditions. Overall, both VAM and MVAM are effective for solving transportation problems, with their efficiency levels influenced by the cost structure and the balance between supply and demand.

Keywords*: transportation problem, VAM, MVAM, Stepping Stone, Raskin.*