

## ABSTRAK

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**Judul Skripsi** : **Perbandingan Solusi Optimal Untuk Masalah *Fully Fuzzy Linear Programming* Menggunakan *Karpagam's Method* dan *Bound and Decomposition Method***

Program linear adalah model umum dalam pengalokasian sumber daya yang terbatas secara optimal yaitu memaksimalkan keuntungan atau meminimumkan biaya, salah satu asumsi dalam pemrograman linear adalah asumsi kepastian tentang nilai parameter pada masalah pengambilan keputusan yang dimodelkan. Namun dalam prakteknya asumsi tersebut sulit untuk dipenuhi karena banyak data dari informasi bukanlah data yang deterministik. Untuk mengatasi asumsi ketidakpastian tersebut maka diterapkan teori himpunan *fuzzy* pada pemrograman linear yang disebut dengan *Fuzzy Linear Programming*. Model *Fuzzy Linear Programming* terus dikembangkan sehingga terbentuklah *Fully Fuzzy Linear Programming* yang semua nilai-nilai parameternya berupa bilangan *fuzzy*. Pada penulisan ini dikemukakan dua metode untuk mencari solusi optimal dari permasalahan *Fully Fuzzy Linear Programming* yaitu Metode *Karpagam's* dan Metode *Bound and Decomposition*. Langkah pengerjaan Metode *Karpagam's* tahap 1 mengubah bentuk *Fully Fuzzy Linear Programming* kedalam bentuk standar *Fully Fuzzy Linear Programming*. Tahap 2 mentransformasikan permasalahan *Fully Fuzzy Linear Programming* kedalam bentuk *Fuzzy Variable Linear Programming* menggunakan *Ranking Function* kemudian diselesaikan menggunakan Metode Simpleks atau Big M, solusi optimal dari *Fuzzy Variable Linear Programming* merupakan solusi optimal *Fully Fuzzy Linear Programming*. Sedangkan langkah pengerjaan Metode *Bound and Decomposition* tahap 1 menguraikan kedalam bentuk *Crisp Linear Programming (CLP)* yaitu *Middle Level Problem (MLP)*, *Upper Level Problem (ULP)*, dan *Lower Level Problem (LLP)*. Ketiga bentuk *MLP*, *ULP*, dan *LLP* diselesaikan menggunakan Metode Simpleks atau Big M, tahap 2 solusi optimal dari *MLP*, *ULP*, dan *LLP* dikumpulkan sehingga didapat solusi *Fully Fuzzy Linear Programming*. Metode *Karpagam's* valid pada kasus bilangan fuzzy segitiga simetris, pada studi kasus dalam penelitian ini dibandingkan Metode *Karpagam's* lebih optimal dari Metode *Bound and Decomposition*.

**Kata Kunci**: *Fuzzy, Fuzzy Variable Linear Programming, Fully Fuzzy Linear Programming, Metode Simpleks, Metode Big M, Ranking Function, Metode Karpagam's, Metode Bound and Decomposition.*

## **ABSTRACT**

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**Title** : *Comparison of Optimal Solution for Fully Fuzzy Linear Programming Problems Using Karpagam's Method and Bound and Decomposition Method*

*Linear programming is a general model in optimally allocating limited resources that is maximizing profits or minimizing costs, one of the assumptions in linear programming is the assumption of certainty about the parameter values on the decision-making problem being modeled. But in practice these assumptions difficult to fulfill because a lot of data from information is not deterministic data. To overcome this uncertainty assumption, fuzzy set theory is applied to linear programming called Fuzzy Linear Programming, the Fuzzy Linear Programming model continues to be developed so that a Fully Fuzzy Linear Programming is formed where all the parameter values are fuzzy numbers. In this paper, two method are proposed to determine the optimal solution of the problem of Fully Fuzzy Linear Programming, namely Karpagam's Method and Bound and Decomposition Method. Phase 1 in Karpagam's Method stage is to convert the form of Fully Fuzzy Linear Programming into the standard form of Fully Fuzzy Linear Programming. Phase 2 transforms the problem of Fully Fuzzy Linear Programming into the form of Fuzzy Variable Linear Programming using Ranking Function and then solved using the Simplex Method or Big M, the optimal solution of Fuzzy Variable Linear Programming is the optimal solution of Fully Fuzzy Linear Programming. While the steps of the Bound and Decomposition Method phase 1 describe the form of Crisp Linear Programming (CLP), namely Middle Level Problem (MLP), Upper Level Problem (ULP), and Lower Level Problem (LLP). The three forms of MLP, ULP, and LLP are solved using the Simplex or Big M Method, phase 2 the optimal from MLP, ULP, and LLP are collected in order to obtain a Fully Fuzzy Linear Programming solution. Karpagam's Method is valid in case studies of symmetrical fuzzy triangle numbers, the case study in this paper compared to Karpagam's Method is more optimal than the Bound and Decomposition Method.*

**Keywords:** *Fuzzy, Fuzzy Variable Linear Programming, Fully Fuzzy Linear Programming, Simplex Method, Big M Method, Ranking Function, Karpagam's Method, Bound and Decomposition Method.*