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NB Theory with Bargaining Problem: A New Theory

Noorulden Basil [a,1,*], Alfian Ma'arif [b,2]

[a] Department of Computer Techniques Engineering, Al-Esraa University College, Baghdad, Iraq
[b] Universitas Ahmad Dahlan, Yogyakarta, Indonesia
[1] nooralden@esraa.edu.iq; [2] alfian.maarif@te.uad.ac.id
* Corresponding Author

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ABSTRACT

A new theory is proposed to achieve desired set of values for an engineering system based on a single algorithm that consists of all optimization algorithms. This algorithm considers an engineering system's main variables, dimensions, and functions; all these parameters will be set and tuned by a systematic search in the main library. This single algorithm automatically selects an optimization algorithm suitable for a particular optimization problem. Additionally, this theory, which was inspired by the idea of bargaining theory and Noorulden Basil theory, referred to as NB Theory, can be done using MATLAB Software.

1. Introduction

The bargaining theory becomes captivating due to its important issue, mainly when applied to single or double-group individuals with any two-agent game. The theory originated from an economic theory by [1], which later was developed and proposed as a new optimization theory-based algorithm with artificial intelligence to solve optimized values for all fields, especially in mathematics and general engineering [2]–[4]. The new theory is extended and can be applied with MATLAB libraries. For example, any optimization algorithm in the main library can be used by calling its function [5]–[7]. Meanwhile, additional variables, dimensions, and system variants, whether the optimized system is linear or nonlinear, are considered before calling the function [8]–[10]. The applied values become a popular issue in optimization problems since they can make the general system work in a stable or unstable mode; therefore, the lower/upper cases should be more specific and better [9]–[11]. Bargaining theory can be classified in the gaming and economical behavior for the n-person games theory is enhanced via involves as a special case for the two-persons problems for bargaining by define the combinations for their components with respect to the anticipation between 0 and 1, then [12]–[14],

$$p[A,B]+(1-P)[C,D] \tag{1}$$

The definition will be as follow

$$[pA+(1-P)C, pB+(1-p)D] \tag{2}$$

According to the utility functions, consider to $u1$ and $u2$ for the double individuals with $c(S)$ that described the solution of point in the sets which refer to S. Fig. 1 describe the two intelligent individuals' relation [15][16].

Bargaining theory is a way to achieve economic goals through artificial intelligence methods instead of dealing with a large number of people. The new theory proposes a new method to solve all issues mentioned above with AI [17]–[19].

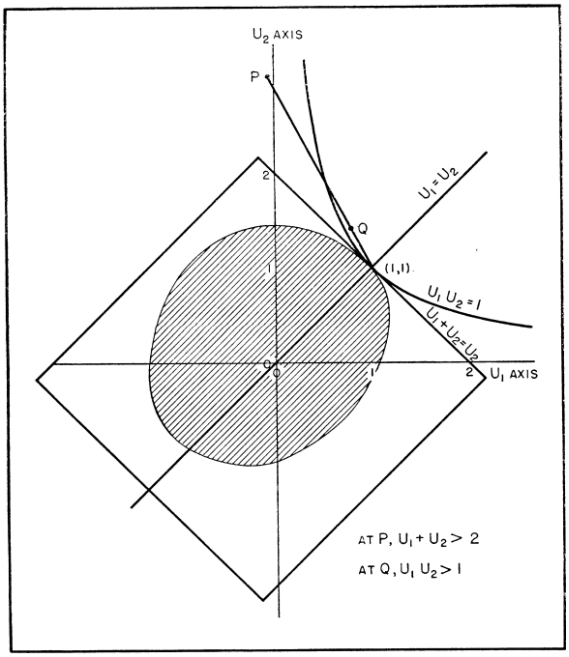

Fig. 1. the two intelligent individuals' relation.

2. NB Theory

The new theory is a single algorithm that can be applied to curtail all researchers/authors' efforts to achieve and collect the desired results and solutions instead of using a vast number of optimization algorithms [20]–[22]. The first step in applying the theory is inserting all libraries into a single MATLAB library [23]–[25]. The library consists of all optimization algorithms along with their respective calling functions. Meanwhile, the purpose of the main function is to call all artificial intelligence algorithms regarding weights, variables, and dimensions of an engineering system with auto-tuning methods, such as in an intelligent thing. The novel algorithm will search for a more suitable algorithm to be performed in a considered number of iterations and parameters so that reasonably precise results can be achieved in a fast-running time [26][27].

3. Conclusions

The main goal of this theory is to provide solutions to all researchers and authors by inserting all optimization algorithms as a single type in the MATLAB library. Therefore, desired results for various engineering systems can be achieved while solving the number of optimization algorithms used. Additionally, this theory provides an idea to make better solutions in finding parameters/variables values with the least running time and the desired values instead of utilizing each algorithm with lower/upper bounds according to the economic bargaining problems.

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