Resolving the Fuzzy Dynamic Programming Problem by Genetic Algorithm with Chaos Theory

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ABSTRACT

The traditional optimization problem is defined as designing an optimal system within given resources so as to get the best utilization of resources and the desired objective values. However, the traditional optimization problem is lack of the ability of improving the objective value of itself by extending its given resources. Therefore, Prof. Zeleny proposed De-Novo plan to enhance the traditional plan of optimization. With the extendable resources, a decision maker can design the optimal system according to his available budgets. Since the real world enterprises always achieve their final goals by the multi-stage improvement, i.e., the annual plan with multiple fuzzy goals, this study explores the fuzzy multi-stage De-Novo programming problem: each stage contains more than one goal as time varies. To resolve this special problem, we use fuzzy dynamic programming and genetic algorithms (GAs). Moreover, the chaos theory is also used to facilitate the traditional GA: the GA with chaos is compare with the traditional GA for their performances. Finally, we suggest the GA with chaos is more outstanding for resolving the fuzzy multi-stage De-Novo programming problem because of its higher performance and stability.

Keywords : De Novo ; Fuzzy Dynamic Programming ; Genetic Algorithm ; Chaos Theory

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