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INITIALIZING ANT (IA) AS AN AGENT IN INITIALIZING POPULATION OF GENETIC ALGORITHM ON FUZZY SHORTEST PATH

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ABSTRACT

Shortest Path (SP) problems in which, the determination of minimal path from source to the destination in the network G=$\{V, E\}$, have many dimensions in various fields of application. The algorithms for Shortest Path (SP) problems have been emerging in higher degree. In real time applications, most parameters (distance, bandwidth, time etc.,) cannot be determined or assigned with the real numbers in solving Shortest Path (SP) problems. It becomes the necessity for the introduction of fuzzy numbers which comprises vertices and edges. Here we consider the generalized trapezoidal fuzzy numbers, which can be dealt with the uncertainty using fuzzy set theory. Genetic Algorithm (GA) provides new space to the emerging algorithm in recent trends of research. In this paper, we concentrate in upgrading population initialization of Genetic Algorithm (GA) using initializing ants resulting in high convergence with ranking of generalized trapezoidal fuzzy numbers, which is proposed recently, as a fitness function. The proposed model is implemented using MATLAB with the test network of 30 nodes and the results reports that the algorithm converges in a more reasonable time in comparison with conventional GA.

KEYWORDS: Genetic Algorithm, Ant Colony, Generalized Trapezoidal Fuzzy Number, Ranking Function, Shortest Path Problem