

Multichannel Sale Optimization via Constrained Swarm Intelligence

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Abstract

Nature-inspired metaheuristic optimization has been widely used in many problems in industry and scientific investigations, but their applications in designing selling scheme are rare because the solution space in this kind of problems is usually high-dimensional, and their constraints are sometimes cross-dimensional. Recently, the Swarm Intelligence Based (SIB) method is proposed for problems in discrete domains, and it is widely applied in many mathematical and statistical problems that common metaheuristic methods seldom approach. In this work, we introduce an extension of the SIB method that handles solutions with many dimensions, or tensor solution in mathematics. We further speed up our method by implementing our algorithm with the use of CPU parallelization. We then apply this extended framework to real applications in designing selling scheme, showing that our proposed method helps to increase the profit of a selling scheme compared to those suggested by traditional methods.

Keyword: Swarm Intelligence, Constrained Optimization, Multichannel Sale, Tensor, Nature-Inspired Metaheuristic Optimization