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Free Search – comparative analysis 100

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Abstract: Search methods' abilities for adaptation to various multidimensional tasks where optimisation parameters are hundreds, thousands and more, without retuning of algorithms' parameters seems to be a great challenge for modern computational intelligence. Many evolutionary, swarm and adaptive methods, which perform well on numerical tests with up to ten dimensions are suffering insuperable stagnation when applied to 100 and more dimensional tests. This article presents a comparison between particle swarm optimisation, differential evolution both with enhanced adaptivity and Free Search applied to 100 multidimensional heterogeneous real-value numerical tests. The aim is to extend the knowledge on how high dimensionality reflects on search space complexity, in particular to identify minimal time and minimal number of objective function evaluations required by used methods for reaching acceptable solution with non-zero probability on tasks with high dimensions' number. The achieved experimental results are summarised and analysed. Brief discussion on concepts, which support search methods effectiveness, concludes the article.

Biographical notes: Kalin Penev's research interests include adaptive heuristic methods for search and optimisation, modelling cognitive processes, visualisation of search processes, knowledge management, mobile applications and computer systems. He is the originator of adaptive heuristic method called Free Search. He has published books and papers in the field of adaptive search heuristics, and their applications. He is the Chair of Optimisation of Mobile Communication Networks – OMCO NET mini-conference. He is teaching computer systems, mobile applications, information technology platforms, and optimisation and search algorithms.

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