

Parallelization of Genetic Algorithms and Propagation Techniques

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Abstract: In the field of global optimization, various methods have been developed for locating the global minimum. One of the most popular approaches is optimization using genetic algorithms, which has gained favor due to its exceptional performance in finding effective solutions. However, this method requires computational resources and time, prompting the need for parallel techniques. In the context of this research, we propose innovative changes aiming at the efficient parallelization of genetic algorithms. This novel approach utilizes independent parallel computing units that periodically exchange the best solutions they have identified. The application of this proposed technique to various computational problems has generated enthusiasm, as the results surpass expectations. It has been observed that increasing the number of computational threads, in combination with solution exchange techniques, can significantly reduce the number of calls to the objective function. This constitutes a critical speed criterion for finding the global minimum.

Keywords: Parallel techniques; Global optimization; Genetic algorithms; Evolutionary techniques

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