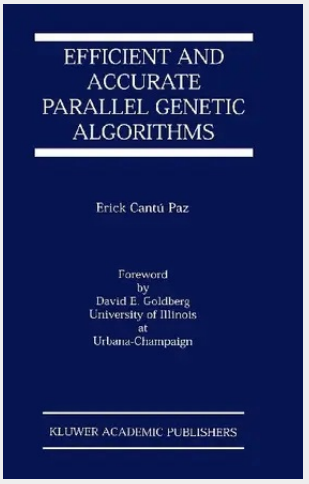
Cantú-Paz

Efficient and Accurate Parallel Genetic Algorithms



As genetic algorithms (GAs) become increasingly popular, they are applied to difficult problems that may require considerable computations. In such cases, parallel implementations of GAs become necessary to reach high-quality solutions in reasonable times. But, even though their mechanics are simple, parallel GAs are complex non-linear algorithms that are controlled by many parameters, which are not well understood.
is about the design of parallel GAs. It presents theoretical developments that improve our understanding of the effect of the algorithm's parameters on its search for quality and efficiency. These developments are used to formulate guidelines on how to choose the parameter values that minimize the execution time while consistently reaching solutions of high quality.
can be read in several ways, depending on the readers' interests and their previous knowledge about these algorithms. Newcomers to the field will find the background material in each chapter useful to become acquainted with previous work, and to understand the problems that must be faced to design efficient and reliable algorithms. Potential users of parallel GAs that may have doubts about their practicality or reliability may be more confident after reading this book and understanding the algorithms better. Those who are ready to try a parallel GA on their applications may choose to skim through the background material, and use the results directly without following the derivations in detail. These readers will find that using the results can help them to choose the type of parallel GA that best suits their needs, without having to invest the time to implement and test various options. Once that is settled, even the most experienced users dread the long and frustrating experience of configuring their algorithms by trial and error. The guidelines contained herein will shorten dramatically the time spent tweaking the algorithm, although some experimentation may still be needed for fine-tuning.
is suitable as a secondary text for a graduate level course, and as a reference for researchers and practitioners in industry.

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