Tomassini, Marco

Spatially structured evolutionary algorithms. Artificial evolution in space and time. (English)

Zbl 1089.68114

Natural Computing Series. Berlin: Springer (ISBN 3-540-24193-0/hbk). xiii, 192 p. (2005).

The focus of this very interesting book is on evolutionary heuristic algorithms and in particular those evolutionary algorithms that are 'spatially structured' which exhibit slightly different properties than standard evolutionary algorithms.

The book starts with a very useful introduction on graphs and cellular models, where most of the terminology is laid out. The author then continues by studying island models in more detail, which includes theoretical and experimental investigations as well as results.

In Chapter 4, the book introduces the idea of lattice cellular systems. They can be seen as an extension of the island models described earlier and are more useful in populations for which locality is an important factor. This is followed by a chapter on empirical characteristics of this type of cellular systems.

The last three chapters concentrate on random and irregular cellular systems. These include small-world networks such as the Watts-Strogatz and the Barabási-Albert models. Furthermore, some properties of special, nonconventional models are also presented. The book also contains a useful chapter on co-evolution of structured models and an appendix containing implementation notes, useful for anyone who would like to experiment with these algorithms on a computer. The book concludes with a detailed list of references and an index.

Reviewer: Efstratios Rappos (London)

MSC:

68T05	Learning and adaptive systems in artificial intelligence
68T20	Problem solving in the context of artificial intelligence (heuristics, search strategies, etc.)
68W25	Approximation algorithms
68W10	Parallel algorithms in computer science
68W15	Distributed algorithms
90C59	Approximation methods and heuristics in mathematical programming
68-01	Introductory exposition (textbooks, tutorial papers, etc.) pertaining to computer science

Keywords:

evolutionary algorithms; island models; artificial evolution; cellular models; lattice models

Full Text: DOI