Bartz-Beielstein

# Experimental Research in Evolutionary Computation

The New Experimentalism




Experimentation is necessary - a purely theoretical approach is not reasonable. The new experimentalism, a development in the modern philosophy of science, considers that an experiment can have a life of its own. It provides a statistical methodology to learn from experiments, where the experimenter should distinguish between statistical significance and scientific meaning.

This book introduces the new experimentalism in evolutionary computation, providing tools to understand algorithms and programs and their interaction with optimization problems. The book develops and applies statistical techniques to analyze and compare modern search heuristics such as evolutionary algorithms and particle swarm optimization. Treating optimization runs as experiments, the author offers methods for solving complex real-world problems that involve optimization via simulation, and he describes successful applications in engineering and industrial control projects.

The book bridges the gap between theory and experiment by providing a self-contained experimental methodology and many examples, so it is suitable for practitioners and researchers and also for lecturers and students. It summarizes results from the author's consulting to industry and his experience teaching university courses and conducting tutorials at international conferences. The book will be supported online with downloads and exercises.

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**53,49 €**
49,99 € (zzgl. MwSt.)

*Lieferfrist: bis zu 10 Tage*

**Artikelnummer:** 9783540320265
**Medium:** Buch
**ISBN:** 978-3-540-32026-5
**Verlag:** Springer
**Erscheinungstermin:** 20.03.2006
**Sprache(n):** Englisch
**Auflage:** 1. Auflage 2006
**Serie:** Natural Computing Series
**Produktform:** Gebunden
**Gewicht:** 466 g
**Seiten:** 215
**Format (B x H):** 160 x 241 mm