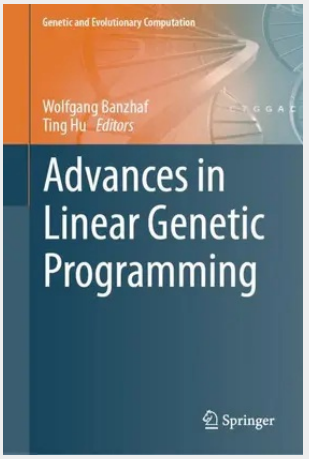
Banzhaf / Hu

Advances in Linear Genetic Programming



Linear Genetic Programming (LGP) represents a significant branch of evolutionary computation that continues to advance both in theoretical understanding and practical applications. This comprehensive volume provides researchers, practitioners, and students with an up-to-date examination of LGP, covering developments since the field's first dedicated book appeared in 2007. As machine learning and artificial intelligence increasingly drive innovation across application fields, LGP's ability to evolve computer programs in a linear sequence of instructions has proven particularly valuable for complex real-world problems.

This edited collection brings together leading experts to explore theoretical advances, novel applications, and modern implementation strategies in LGP. The book covers crucial developments in areas such as convergence behavior, genotype-phenotype mapping, and operator effectiveness, while showcasing LGP's practical impact through applications in control systems, environmental modeling, mathematical discovery, and automated machine learning (AutoML). Special attention is given to modern implementation approaches, including GPU acceleration, field-programmable gate array (FPGA) deployment, and software engineering best practices that enable efficient LGP system development.

Readers will gain a thorough understanding of both fundamental concepts and cutting-edge developments in the field, enabling them to implement and extend LGP systems for their own applications. While primarily intended for researchers and practitioners in evolutionary computation and machine learning, the book assumes only basic knowledge of genetic programming and computer science. Each chapter builds progressively on core concepts, making the material accessible while maintaining technical depth and rigor.

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