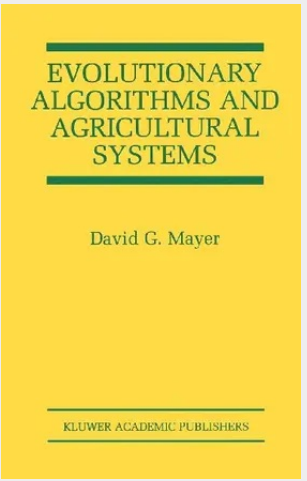
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Evolutionary Algorithms and Agricultural Systems



deals with the practical application of evolutionary algorithms to the study and management of agricultural systems. The rationale of systems research methodology is introduced, and examples listed of real-world applications. It is the integration of these agricultural systems models with optimization techniques, primarily genetic algorithms, which forms the focus of this book. The advantages are outlined, with examples of agricultural models ranging from national and industry-wide studies down to the within-farm scale. The potential problems of this approach are also discussed, along with practical methods of resolving these problems.
Agricultural applications using alternate optimization techniques (gradient and direct-search methods, simulated annealing and quenching, and the tabu search strategy) are also listed and discussed. The particular problems and methodologies of these algorithms, including advantageous features that may benefit a hybrid approach or be usefully incorporated into evolutionary algorithms, are outlined. From consideration of this and the published examples, it is concluded that evolutionary algorithms are the superior method for the practical optimization of models of agricultural and natural systems. General recommendations on robust options and parameter settings for evolutionary algorithms are given for use in future studies.
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