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A New Real-coded Genetic Algorithm Using the Adaptive Selection Network for Detecting Multiple Optima 1912
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Solution of Real-parameter Optimization Problems Using Novel Quantum Evolutionary Algorithm with Applications in Power Dispatch 1920
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The Multiobjective Evolutionary Algorithm Based on Determined Weight and Sub-regional Search 1928
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An Orthogonal Multi-objective Evolutionary Algorithm with Lower-dimensional Crossover 1959
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A Memory-Based Colonization Scheme for Particle Swarm Optimization 1965
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Inertial Geometric Particle Swarm Optimization 1973
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Search Methodologies for Efficient Planetary Site Selection 1981
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Particle Swarm Optimisation and High Dimensional Problem Spaces 1988
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Scalability of the Vector-based Particle Swarm Optimizer 1995
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An Isoline Genetic Algorithm 2002
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Multiobjective Optimization: Redundant and Informative Objectives 2008
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