Geophysical Research Abstracts
Vol. 12, EGU2010-407, 2010
EGU General Assembly 2010


# Metaheuristic Optimization and its Applications in Earth Sciences

Xin-She Yang
Department of Engineering, University of Cambridge, Cambridge CB2 1PZ, UK (xy227@cam.ac.uk)

A common but challenging task in modelling geophysical and geological processes is to handle massive data and to minimize certain objectives. This can essentially be considered as an optimization problem, and thus many new efficient metaheuristic optimization algorithms can be used. In this paper, we will introduce some modern metaheuristic optimization algorithms such as genetic algorithms, harmony search, firefly algorithm, particle swarm optimization and simulated annealing. We will also discuss how these algorithms can be applied to various applications in earth sciences, including nonlinear least-squares, support vector machine, Kriging, inverse finite element analysis, and data-mining.
We will present a few examples to show how different problems can be reformulated as optimization. Finally, we will make some recommendations for choosing various algorithms to suit various problems.

References

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