

**Special Issue on
“Computational Intelligence Optimisation in the Presence
of Uncertainties”**

Many real-world optimization problems are characterized by various forms of uncertainties stemming from factors such as data incompleteness and uncertainty, environmental condition uncertainty, and designs that cannot be implemented exactly. Generally, uncertainties in evolutionary optimization can be categorized into four classes:

1. Noisy fitness function: Noise in fitness evaluations may come from many different sources such as sensory measurement errors or randomized simulations.
2. Approximated fitness function: When the fitness function is very expensive to evaluate, or an analytical fitness function is not available, approximated fitness functions are often used instead.
3. Robustness: Often, when a solution is implemented, the design variables or the environmental parameters are subject to perturbations or changes. Therefore, a common requirement is that a solution should still work satisfyingly either when the design variables change slightly, e.g., due to manufacturing tolerances, or when the environmental parameters vary slightly. This issue is generally known as the search for robust solutions.
4. Dynamic fitness function: In a changing environment, it should be possible to continuously track the moving optimum rather than repeatedly re-start the optimization process. For evolutionary computation in dynamic environments, learning and adaptation usually play an important role. Multi-objective problems may also involve dynamic environments.

The presence of uncertainties poses serious challenges to computational intelligence techniques, sparking increasing efforts and research on uncertainty handling over the past years. A variety of methods for addressing uncertainties have been reported from different application backgrounds.

The objective of the special issue is to foster interest in the issue of handling uncertainties, encourage active participation among researchers from the academia and industry, review latest advances, and explore future directions. We endeavor to increase the awareness of the research community to state-of-the-art methodology and their successful applicability to uncertain environment. Papers are solicited addressing any of the aforementioned four areas and/or their combination with optimization methods inspired by nature. Theoretical and empirical results as well as real-world applications are welcome. Topics of interests include (but are not limited to):

- Realistic Benchmark problems and performance measures
- Dedicated hardware implementations for real-time adaptation
- Dynamic multi-objective optimization
- Noisy multi-objective optimization

- Adaptation, learning, and anticipation
- Handling noisy fitness functions
- Using fitness approximations
- Using surrogate models
- Searching for robust optimal solutions
- Comparative studies
- Hybrid and memetic approaches for handling uncertainties
- Theoretical analysis
- Real-world applications

Important Dates:

Submission deadline: 14th November 2010

Notification of 1st round review: 31st January 2011

Revised Submission Due: 31st March 2011

Final Notification of Acceptance: 31st May 2011

Final Manuscript Due: 30th June 2011

Expected publication time: 2011

All submissions are subject to review, and acceptance will be limited to papers needing only moderate revisions. Submissions must be performed by using the online Taylor and Francis system available at the link <http://mc.manuscriptcentral.com/tsys>. All enquiries on this special issue should be sent to Dr. Chi-Keong Goh or Dr. Ferrante Neri.

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