

Special issue on

Optimization with Uncertain Information: A Perspective of Soft Computing

Introductory notes and key highlights

Optimization permeates all endeavors of human activities and exhibits a remarkably high diversity and complexity of problems and applications.

There is no surprise that with the ever increasing complexity of problems, optimization comes with an inherent facet of uncertainty conveyed in different formal ways and calls for innovative approaches to produce optimal and interpretable solutions as well as deliver user-centric environments.

Soft Computing with its broad ornamentation of technologies of knowledge representation (fuzzy sets), learning (neural networks), and evolutionary methods, plays a pivotal role in the formulating and solving optimization tasks.

A quick Google Scholar query on optimization and Soft Computing clearly demonstrates a rapid and steady growth of the area as demonstrated in the graph presented below:

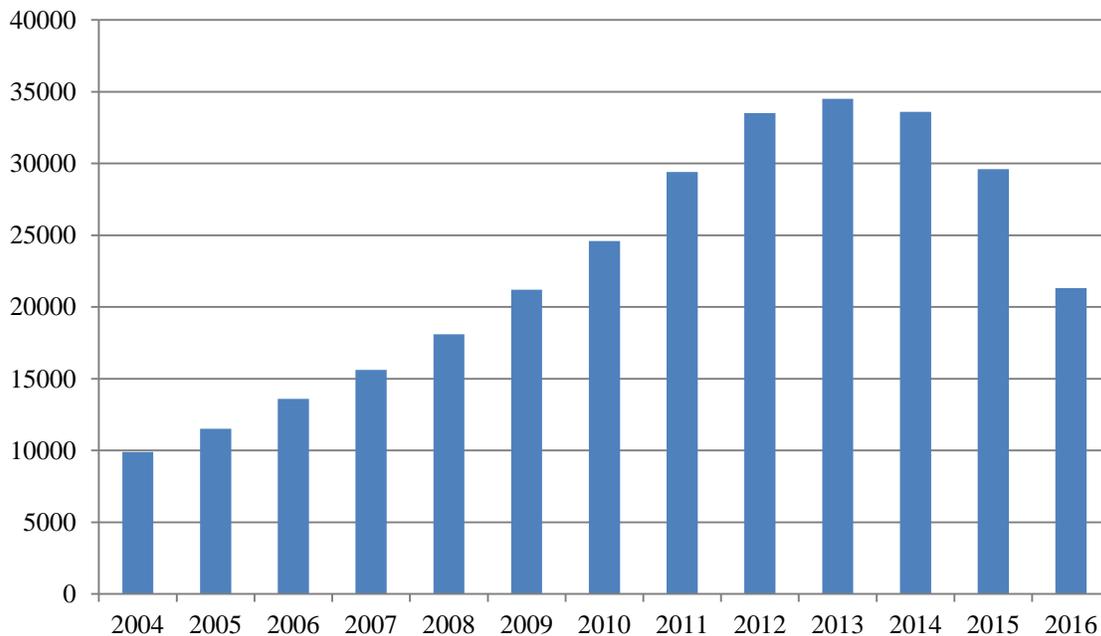


Figure 1: The number of papers related to optimization and soft computing

There have been a significant number of publications in the area however there is a lack of a focused material that brings recent advancements of Soft Computing-driven uncertain optimization methodology, algorithms, and applications.

Key objectives

The proposed special issue aims at the addressing several key objectives, which in light of the observations made above are both important and timely:

- presentation of a unified view at the methodologies of coping with uncertainty in optimization through the usage of concepts of Soft Computing
- reporting on the linkages between methodology and practice of optimization, simultaneously delivering contrastive view at approaches and solutions produced by “standard” methods outside the realm of Soft Computing
- inclusion of state-of-the-art case studies in selected areas of application

List of main topics of interest of the special issue

There are a number of focal points of the issue that make this project coherent, justifiable and relevant. In what follows, we concisely identify the main topics along with a few lines of justification.

➤ **Evolutionary computing**

Evolutionary computing, inspired by the biological mechanism of evolution, is a global optimization method with heuristic or stochastic optimization character. They are mostly used for black box problems (no derivatives known), often in the context of expensive optimization. Uncertain optimization is one of these black box problems.

➤ **Neural networks**

Neural networks are a family of statistical learning algorithms inspired by biological neural networks and are used to approximate functions that can depend on a large number of inputs and are generally unknown. Uncertain optimization system is essential an unknown function with numerous inputs.

➤ **Soft computing + Forecasting + Uncertain optimization**

The topics of soft computing, forecasting and uncertain optimization are highly related. Soft computing is the basic of forecasting and uncertain optimization methods. And forecasting information can improve the performance of optimality. Here, we mainly concern the soft computing-based forecasting methods, soft computing-based uncertain optimization methods, and forecasting information-based uncertain optimization methods.

➤ **Uncertain optimization + Big data**

Big data analysis is the first step in the solution of problem. Acting on the analysis results to make good decisions via optimization methods is the critical next step. During this process, innovative soft computing, forecasting and uncertain analysis methods would be respectively used to handle the high volume, high velocity and high variety characteristics of big data.

➤ **Innovative applications**

The state-of-the-art case studies include design and analysis of transportation networks, logistics and supply chains, hazardous materials transportation, portfolio management and optimization, risk management, robust design, network reliability, software reliability, redundancy optimization, decision support and so on.

Submission

Papers will be evaluated based on their originality, presentation, relevance and contribution to the topic of *Optimization under Uncertainty*, as well as their suitability and the quality in terms of both technical contribution and writing. The submitted papers must be written in good English and describe original research which has not been published nor is currently under review by other journals or conferences. If used, the previously published conference papers should be clearly identified by the authors (at the submission stage) and an explanation should be provided in which way how such papers have been extended to be considered for this special issue. The Guest Editors will make an initial decision of the suitability and scope of all submissions. Papers that either lack originality, clarity in presentation or fall outside the scope of the special issue will not be sent for review and in such cases the authors will be promptly informed.

Suggested schedule - important dates

Manuscript submission: January 1st, 2017 to [March 30, 2017](#)

Revised version submission deadline: [May 30, 2017](#)

Acceptance notification: [July 30, 2017](#)

Final manuscripts due: [August 30, 2017](#)

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