Competition on Constrained Numerical Optimization @ CEC, Barcelona, Spain, July'2010

Most optimization problems have constraints of different types which modify the shape of the search space. During the last two decades, a wide variety of metaheuristics have been designed and applied to solve constrained optimization problems. Evolutionary algorithms and most other metaheuristics naturally operate as unconstrained search techniques. Therefore, they require an additional mechanism to handle constraints during the search process. Historically, the most common approach to handling constraints are the penalty functions originally proposed in the 1940s and later expanded by many researchers. Penalty functions are not effective if the optimum lies in the boundary between the feasible and the infeasible regions or when the feasible region is disjoint. Researchers have also proposed a number of other approaches to handle constraints such as the self-adaptive penalty, epsilon constraint handling and stochastic ranking. Developing novel constraint handling methods and investigating the performances of search engines on solving constrained problems have attracted much interest recently.

Irrespective of the high level of interest in constrained real-parameter optimization, the current constrained optimization test suite (CEC 2006 Benchmark Problems) has dimensions between 2 and 20 which is very low. In addition, CEC 2006 benchmark has been solved satisfactorily by several methods. Therefore, it has become impossible to demonstrate the superior performance of newly designed algorithms. Therefore, there is an urgent need to upgrade the current test suite by increasing dimensional scalability and by considering the types of constraints (equality, inequality, linear, nonlinear, dimensionality, active, etc.), types of objective functions (linear, quadratic, nonlinear, multimodality, separability, etc.), connectivity / relative size of feasible region and so on. In addition, it would be beneficial to evaluate and, if necessary, develop novel performance measures to deal with the diverse characteristics of the real-world constrained optimization problems. We plan to present an extended test suite and standardized evaluation measures for researchers to test their algorithms till the CEC'2010 submission deadline in late January 2010. Along with the papers, we would also optionally like participants to submit their codes and we shall put it up on a web-site for anyone to try out. The submitted papers will be peer-reviewed and selected authors will be invited to present their results during CEC-2010. We hope this exercise will be helpful for researchers interested in this field and may generate new ideas to advance the research in this area.

With this background and thoughts, we now invite you give your feedbacks / suggestions on the extended test suite and evaluation metrics and would like to know if you would be willing to participate in this exercise. Any sort of search engine is allowed, including hybrids with mathematical programming techniques as well as different metaheuristics. Please could you kindly send an email to the organizers with the following details?

---

1. Name:
2. Email:
3. URL:
4. I am interested in participating in this special session: Yes/No
5. My preferred procedure for constrained optimization:
6. If you know of researchers who might be interested in making contribution(s), please kindly provide names/email addresses. Thank you.

We hope to have the codes of the test functions available by early November 2009 from http://www.ntu.edu.sg/home/EPNSugan.

Thank you

Competition Organizer:
A/Prof. P. N. Suganthan (epnsugan@ntu.edu.sg)