EVOLUTIONARY COMPUTATION FOR NP-PROBLEMS

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Many decision problems in business and economics, notably including these in manufacturing, location, routing and scheduling may be formulated as optimization problems, particularly, as combinatorial problems. Typically these problems are too difficult to se solved exactly within a reasonable amount of time, that is are NP-hard, and heuristics become the methods of choice.

Genetic Algorithms (Gas) are members of a family of heuristics commonly known as modern heuristic techniques that simulate the mechanisms of natural evolution.. The GA starts with a population of solutions for the given problem and, using selection of the fittest mechanisms and genetic recombination processes, evolves populations of solutions which converge to (near) optimal solutions.

GAs have been generally more successful at solving parameter optimization problems than combinatorial problems. The reason seems to be that a string of numeric parameters, represented as bit strings or numbers, induce schemata in a natural way that can be exploited for many problems. On the other hand, combinatorial problems works out in discrete domains where representations that induce good schema are hard to find. Two approaches are commonly used: to either devise a special representation that will induce good schemata or devise special operators to recombine and preserve schemata that one knows are important for the problem at hand (such as for the travelling salesman problem).

This session will consider papers oriented to reduce the computational cost required of NP-Problems using Evolutionary Computation which comprises a great variety of different concepts and paradigms including GAs, Evolutionary Strategies, Evolutionary Programs, Scatter Search, Memetic Algorithms and Artificial Immune Systems.

TOPICS OF INTEREST
Related topics of interest for the session include, but are not restricted to, the application of Evolutionary Computation technologies to:

- combinatorial optimization problems
- fuzzy optimization problems
- multiobjective optimization
- fuzzy multiobjective optimization
- hybrid approaches
- scheduling
- planning
- travelling salesman problem
- games
- routing