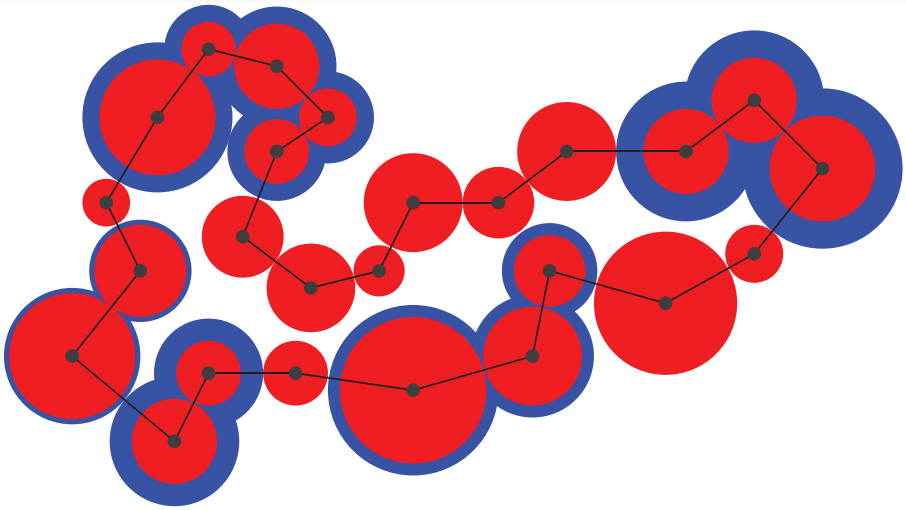
G-SCOP
SCIENCES POUR LA CONCEPTION, L'OPTIMISATION ET LA PRODUCTION

OC TEAM

Combinatorial Optimization

Solving problems of Discrete Mathematics, and designing efficient algorithms

The aim of Combinatorial Optimization is to select the "best" option from a finite (often very large) set of possibilities. It involves identifying the structural properties of the problems considered ("good" characterization, decomposition, etc.), and using these to design efficient (exact or approximation) algorithms or to prove that such algorithms do not exist.



Research Topics

- **Structural Graph Theory :** uses subclasses of graphs in order to study the structural properties of coloring, stability, matching and connectivity problems and find solutions.
- **Complexity, Optimization and Approximation :** involve identifying good characterization theorems and efficient algorithms (exact or approximation algorithms) by combining new ideas with conventional methods such as matching, matroids and linear programming.
- **Geometric Methods :** explore the strong connections between combinatorial optimization and geometry, in particular via linear programming or embedding graphs on surfaces

Scientific Challenges

- **Innovative theoretical research :** Using several branches of mathematics and embracing new challenges: extended linear formulations of combinatorial problems, use of probability and information theory in approximation algorithms, novel applications of matroid theory and graph connectivity, etc.

Partnerships

- **Industrial collaboration :** With A-Systems (agribusiness), Amadeus (airline management) and Mentor Graphics (automation of electronic design)
- **International collaboration :** Algeria, Argentina, Belgium, Brazil, Canada, Chile, Czech Republic, Denmark, Germany, Hungary, Israel, Italy, Japan, Morocco, Netherlands, South Korea, Switzerland, Taiwan, United Kingdom, USA.

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