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Editor's Introduction

Harvey J. Greenberg,

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Editor's Introduction

This second issue of volume three has eight research papers in the interfaces of operations research and computer science, followed by our first paper in the Software Section and a book review.

The first paper, *Optimal Partial-Match Hashing Design*, by Raj Jagannathan, addresses a problem in information retrieval: retrieve all records whose attributes match a partially specified set of attributes. The problem is to minimize expected number of retrievals from secondary memory, given an assumed probability distribution on the query arrivals.

The second paper, *Performance Characteristics of the Jacobi and the Gauss-Seidel Versions of the Auction Algorithm on the Alliant FX/8*, by David N. Kempka, Jeffery L. Kennington and Hossam A. Zaki, addresses a problem raised by Bertsekas' auction algorithm concerning the performance of parallelizations of the entitled methods. The specific architecture of the Alliant is exploited in each case. Problem characteristics, varied in the experiments, include the cost distribution (nearly equal costs tend to yield a large number of nearly optimal assignments).

The third paper, *Unique Names Violations, a Problem for Model Integration or You Say Tomato, I say Tomahto*, by Hemant K. Bhargava, Steven O. Kimbrough, and Ramayya Krishnan, is concerned with how to integrate models that use different names for the same variables. The paper presents a method for automatic detection of violation of the unique names assumption using information, provided by each model, on dimensions and quiddity. Their findings include results of a prototype implementation.

The fourth paper, *Techniques for Improving the LP-Representation of Zero-One Linear Programming Problems*, By Karla L. Hoffman and Manfred Padberg, demonstrates the power of preprocessing the entitled problems. One of the innovative aspects is the effect of their data structure on the computational time needed to reduce the integer program.

The fifth paper, *Column Generation Methods for Probabilistic Logic*, by Brigitte Jaumard, Pierre Hansen and Marcus Poggi de Aragão, addresses a semantic problem in artificial intelligence: determine consistency of the truth probabilities for a collection of clauses. This is known as the probabilistic satisfiability problem, and this paper addresses some generalizations, notably interval-valued and conditional probabilities. Their column-generation algorithm is accompanied by experimental results for up to 14 variables and 300 clauses.

The sixth paper, *A Computational Study of the Job-Shop Scheduling Problem*, by David Applegate and William Cook, combines a heuristic with cutting planes and branch and bound to solve the entitled NP-hard problem. After describing the three types of methods and how they are combined form the final, hybrid method, the authors report results of computational experiments, performed on a Sun Sparcstation 1.

The seventh paper, *Locating Minimal Infeasible Constraint Sets in Linear Programming*, by John W. Chinneck and Erik W. Dravnieks, gives algorithms for isolating a portion of an infeasible linear program. This is an important step in assisting diagnosis formation, which can be automated with a rule-based advisory system.

The eighth paper, *Least-Squares Image Registration*, by Karel Zikan, is a technical note. It describes how to estimate the location of a set of points in the plane after each point is rotated, scaled and translated, subject to random noise.

The Software Section has our first paper, *RANDMOD: A System for Randomizing Modifications to an Instance of a Linear Program*, by Harvey J. Greenberg. This is available as a research tool that supports experiments in algorithms and analysis aids to test effects of such properties as infeasibility, degeneracy and scaling.

Following the papers is a book review: *Genetic Algorithms in Search, Optimization and Machine Learning*, reviewed by Jennifer Ryan. We thank Professor Ryan for her expert guidance.

HARVEY J. GREENBERG
Editor