1 - Automated Solution of Dynamic Programming Problems with DP2PN2Solver

Holger Mauch, Information and Computer Science, University of Hawaii, 1680 East West Road, 96822, Honolulu, HI, United States, hmauch@hawaii.edu

The DP2PN2Solver software automates the tasks a user encounters when solving a discrete optimization problem by means of dynamic programming. The problem specification, including the functional equation, is first parsed and transformed into an intermediate Petri net ("Bellman Net") representation and finally translated into executable code that solves the problem.

2 - Distributed Actor-Based Approach to the Optimal Polygon Triangulation Problem with Visualization Using Colored Petri Nets

Boleslaw Mikolajczak, Computer and Information Science Department, University of Massachusetts Dartmouth, 287 Old Westport Road, Dartmouth, MA 02747, 02747, Dartmouth, MA, bmikolajczak@umassd.edu

A dynamic programming optimization problem of polygon triangulation is being considered in this paper. First, we specify the problem visually and formally using colored Petri nets. The visualization provides natural decomposition options for a designer of a distributed implementation of the polygon triangulation problem. Secondly, several of these decompositions are implemented within the Actor-based distributed programming paradigm using the ActorFoundry environment from the University of Illinois at Urbana-Champagne. Performance analysis of these implementations in terms of execution times, speedups and efficiencies is presented.

3 - Adaptive Resource Allocation Technique to Stochastic Multimodal Projects: A Distributed Platform Implementation in JAVA

Anabela Tereso, Systems and Production Department, Minho's University, 4800-058, Guimarães, Portugal, anabelat@dps.uminho.pt, *Joao Mota*, *Rui Lameiro*

This paper presents the implementation of the dynamic programming model (introduced in a previous paper) for the resolution of the adaptive resource allocation problem in stochastic multimodal project networks. A distributed platform using an Object Oriented language, JAVA, is used in order to take advantage of the available computational resources.

■ TA-17

Tuesday, 9:00-10:30am

Sea Pearl V

Optimization and Radiation Oncology

Cluster: Multi-Criteria Decision Analysis

Invited session

Chair: *Allen Holder*, Mathematics, Trinity University, 715 Stadium Drive, 78212, San Antonio, Texas, United States, aholder@trinity.edu

1 - A Greedy, Least-Squares Approach for IMRT Fluence Map Optimization

Yin Zhang, Dept. of CAAM, Rice University, 6100 Main Street, Rice University, 77005, Houston, Texas, United States, yzhang@caam.rice.edu, *Michael Merritt*

The combinatorial nature of dose-volume constraintsi in IMRT poses significant challenges to fluence map optimization. We introduce a greedy approach based on a least-squares formulation which treats dose distributions as primary independent variables and beamlet intensities as secondary. We will present theoretical and computational results for the proposed approach.

2 - Models for Radiation Therapy Treatment Planning

Edwin Romeijn, 303 Weil Hall, University of Florida, 32611, Gainesville, FL, United States, romeijn@ise.ufl.edu, *James Dempsey*, *Jonathan Li*

We discuss the relationship between dose distribution dominance and criteria that are separable in the dose received by individual points in the patient in the context of optimization models for radiation therapy treatment planning. We also show that many proposed criteria are equivalent to separable criteria in a multi-criteria optimization setting.

3 - Planning Radiotherapy Treatments via Multiple Objective Programming

Allen Holder, Mathematics, Trinity University, 715 Stadium Drive, 78212, San Antonio, Texas, United States, aholder@trinity.edu

Linear programming models have been used to design radiotherapy treatments since the middle 1960s. Most models rely on the discrete radon transform, but differ in their objectives. We show how to incorporate multiple objectives in a manner that provides meaningful solution information. Specifically, we define a multiple objective optimal partition and use this construct to reduce the number of variables.

■ TA-18

Tuesday, 9:00-10:30am

Sea Pearl VI

Flexibility Evaluation in the Automotive Industry

Cluster: Flexible Manufacturing

Invited session

Chair: *Erica Klampfl*, Supply Chain Management, Ford Research & Advanced Engineering, SRL Bldg, MD #2122, 2101 Village Rd., Dearborn, MI, 48124, Dearborn, Michigan, United States, eklampfl@ford.com

1 - Workstation Layouts for Mixed-model assembly lines

Erica Klampfl, Supply Chain Management, Ford Research & Advanced Engineering, SRL Bldg, MD #2122, 2101 Village Rd., Dearborn, MI, 48124, Dearborn, Michigan, United States, eklampfl@ford.com, *Giuseppe Rossi*, *Oleg Gusikhin*

The key to having a flexible automotive assembly plant is not only in the design, but also how quickly the workstation layouts can be rearranged and optimized. We describe a tool that supports efficient workstation layouts for mixed-model assembly lines and provide case studies that evaluate workstation flexibility.

2 - Wall Street risk tools applied to automotive supply chains

Heiko Pieper, 1600 Villa Street Apt. 228, 94041, Mountain View, CA, United States, pieper@stanfordalumni.org

Techniques more frequently associated with Wall Street than supply chains enable automakers and suppliers to optimize tooling, capacity,