THE SSJ CHRONICLE

- スケジューリング学会ニュースレター -

(http://www.sche-socie.jp/)

2006 年 6 月 **Vol. 8 No. 21**

特　集
スケジューリング国際シンポジウム 2006 (ISS2006) 開催迫る！

[開催日] 2006 年 7 月 18 日（火）～ 7 月 20 日（木）

[会場] アルカディア市ヶ谷　私学会館 **(詳細は 2 頁に記載)**

[共催] 日本機械学会生産システム部門, スケジューリング学会

[協賛] 精密工学会，システム制御情報学会，日本ロボット学会，日本経営工学会, 日本工作機械工業会, PSLX コンソーシアム，日本オペレーションズ・リサーチ学会，日本設計工学会，砥粒加工学会，製造科学技術センター, 計測自動制御学会, 日本品質管理学会，自動車技術会, 人工知能学会

[ISS2006 の主旨]

最近のスケジューリング理論の進歩および生産現場での実践技術の進展は目覚しいものがあります．特に，近年のグローバリゼーション，メガコンペティション（大競争）時代においては，企業の存続・発展のためのキーテクノロジーとしての戦略的スケジューリングの重要性は高まる一方です．また，IT 革命に伴い，SCM・APS・TOC などのスケジューリングの方法論や理論が話題となっています．

このような状況のもとで，このシンポジウムは，日本国内と諸外国のスケジューリング研究者が一堂に会し，活発な討論を通じて，相互の交流を深める場として企画されました．第 1 回は，2002 年に浜名湖で，第 2 回は 2004 年に淡路島で, 両シンポジウム共に多数の方にご参加いただき，盛況の内に幕を閉じました.今回が第 3 回です.本シンポジウムでも，活発な討論を通じて，戦略的スケジューリングの新たな技術が創発されることを期待しています．多数の皆様の積極的なご参加をお願いいたします.

組織委員会委員長：藤本 英雄
実行委員会委員長：由良 憲二
国際プログラム委員会委員長：茨木 俊秀

[関連分野]

スケジューリング理論／実践スケジューリング技術／スケジューリング適用事例／最適化法／評価法／APS／SCM／ERP／JIT／TOC／プランニング／コンカレントエンジニアリングなど，スケジューリングに関連する全テーマ

目　次

[参加費]

会員および共催・協賛団体会員	40,000円
その他	50,000円
学生	20,000円

＊　以上は, 1冊の講演論文集, 懇親会代, コーヒーブレイクを含みます.

＊　なお, 最終日7月20日（木）11:20～12:20 の Peter Brucker 氏による招待講演は, どなたでも無料で聴講頂けます.
　Peter Brucker 氏は, スケジューリングに関する標準的な教科書を書かれている著名な方です. スケジューリングに興味のある学生の方など, 多数の皆様のご参加をお待ちしております.

[参加登録]

1）参加登録フォームは
　http://www.se.uec.ac.jp/iss2006/form-j.html
　から利用できます.

2）参加登録の締切りは 2006 年 7 月 10 日(月)です.

3）事前参加登録の締め切りは 2006 年 5 月 31 日(水)でした.
　著者(もしくは少なくとも 1 人の共著者)が 2006 年 5 月 31 日までに事前参加登録を済ませ, 著作権委譲承諾書を ISS 事務局にお送りいただかないと, 講演論文集に掲載されませんのでご注意下さい.

[ISS 問合せ先]

組織委員会事務局

iss06-pa@vier.mech.nitech.ac.jp

組織委員会委員長　藤本英雄
〒466-8555　名古屋市昭和区御器所町
　名古屋工業大学大学院 工学研究科
　情報工学専攻
E-mail: fujimoto.hideo@nitech.ac.jp

実行委員会事務局

実行委員会委員長　由良憲二
〒182-8585 東京都調布市調布ヶ丘
　1-5-1　電気通信大学システム工学科
E-mail: yura@se.uec.ac.jp（問合せ）
http://www.se.uec.ac.jp/iss2006/

[シンポジウム Web ページ]

http://www.se.uec.ac.jp/iss2006/

ISS2006 会場へのアクセス

■ **会　　場**　アルカディア市ヶ谷　私学会館
http://www.arcadia-jp.org/

■ **交通のご案内**　地下鉄有楽町線・南北線　市ヶ谷駅 A1-1 出口
地下鉄新宿線　市ヶ谷駅 A1-1 出口　または　A-4 出口
JR 中央線（緩行）　市ヶ谷駅
＊各出口から徒歩 2 分

■ **所 在 地**　〒102-0073　東京都千代田区九段北 4-2-25
TEL:03-3261-9921　FAX:03-3261-9931

ISS2006 Program

Tuesday, July 18

13:00--13:30

Opening session

13:30--14:30

Keynote speech

[K1] Gate scheduling at airports
Ulrich Dorndorf and Erwin Pesch

14:40--15:40

Technical session 1A: Combinatorial optimization

[1A1] Scheduling of corrugated paper production
Kazuki Matsumoto, Hiroyoshi Miwa and Toshihide Ibaraki

[1A2] An improved approximation algorithm for capacitated multicast routings in networks
Ehab Morsy and Hiroshi Nagamochi

Technical session 1B: Manufacturing systems

[1B1] A study on integrated process planning and scheduling system for holonic manufacturing systems --- Modification of process plans ---
Nobuhiro Sugimura, Rajesh Shrestha, Yoshitaka Tanimizu and Koji Iwamura

[1B2] Life analysis of modules reuse for circulation production
Yong Ji, Hirohisa Narita, Lian-yi Chen and Hideo Fujimoto

16:10--17:40

Technical session 2A: Application and practice 1

[2A1] Sedan shift scheduling model
Yihua Li

[2A2] Subcontractors scheduling on residential buildings construction sites
Thierry Benoist, Antoine Jeanjean, Guillaume Rochart,

Hadrien Cambazard, Emilie Grellier and Narendra Jussien

[2A3] Development of a shipbuilding scheduling system utilizing a weighted constraint satisfaction problem solver
Takuya Nishimura, Yukihiro Nakama, Masayasu Matsuda and Yuki Makino

Technical session 2B: Vehicle scheduling and communication

[2B1] A DP-based heuristic algorithm for the discrete split delivery vehicle routing problem
Yoshitaka Nakao and Hiroshi Nagamochi

[2B2] Hierarchical approach with informational feedback for pickup and delivery problems
Kazutoshi Sakakibara, Manabu Noishiki, Shinya Watanabe, Hisashi Tamaki and Ikuko Nishikawa

[2B3] A novel design aid for scheduling policy toward seamless future-oriented land vehicle satellite communications
Masato Takahashi

18:00--19:30

Reception

Wednesday, July 19

9:00--10:00

Technical session 3A: Scheduling under uncertainty 1

[3A1] Dynamic robust set of approximate nondominated solutions under scenarios
Hiroyuki Nagasawa, Masahide Kawasaki and Kazuko Morizawa

[3A2] Online rescheduling in semiconductor manufacturing
Mingang Cheng, Masao Sugi, Jun Ota, Masashi Yamamoto, Hiroki Ito and Kazuyoshi Inoue

Technical session 3B: Virtual factory

[3B1] A basic study on cost based lot sizing --- Experiments with distributed virtual factory ---
Kentaro Sashio, Susumu Fujii, Toshiya Kaihara and Shinya Inao

[3B2] Manufacturing cell simulation environment synchronising real equipment and virtual factory model

Toshihiro Inukai, Hironori Hibino and Yoshiro Fukuda

10:10--11:10

Technical session 4A: Scheduling under uncertainty 2

[4A1] Robust scheduling under uncertainty in processing time
Keisuke Murakami and Hiroshi Morita

[4A2] A formal model for reactive scheduling problems
Satoshi Sugikawa, Haruhiko Suwa and Hisashi Tamaki

Technical session 4B: Genetic algorithm and Agent based-system

[4B1] Development of new encoding method for the complex production systems
Al-Momani Abd Al-Rahman, Jaber E. Abu Qudeiri and Hidehiko Yamamoto

[4B2] Work scheduling by use of worker model in consideration of learning by on-the-job training
Toshitake Tateno and Keiko Shimizu

11:40--12:40

Keynote speech

[K2] Production scheduling to decrease transportation costs
Kathryn E. Stecke

14:10--15:40

Technical session 5A: Application and practice 2

[5A1] Supply chain management of the iron and steel industry
Mitsushige Shiota

[5A2] Simultaneous optimization of storage allocation and routing problems for belt-conveyor transportation
Masatoshi Ago, Masami Konishi and Tatsushi Nishi

[5A3] Genetic algorithm with reduction of search space using operational constraints and its application to scheduling system for steelmaking process
Satoshi Fujii, Shinji Tomiyama and Ryosuke Kimura

Technical session 5B: Packing problem

[5B1] A guided local search algorithm based on a fast neighborhood search

for the irregular strip packing problem
Shunji Umetani, Mutsunori Yagiura, Takashi Imamichi, Shinji Imahori, Koji Nonobe and Toshihide Ibaraki

[5B2] An iterated local search algorithm based on nonlinear programming for the irregular strip packing problem
Takashi Imamichi, Mutsunori Yagiura and Hiroshi Nagamochi

[5B3] Learning human skills instead of solving optimisation problems: A packing problem example
Blagovest Vladimirov, Hiromi Mochiyama and Hideo Fujimoto

16:10--17:40

Technical session 6A: Machine and shop scheduling 1

[6A1] Scheduling in a two-machine flowshop for the minimization of the sum of absolute deviations from a common due date
Celso Satoshi Sakuraba and Debora P. Ronconi

[6A2] A branch-and-bound algorithm based on Lagrangian relaxation for single-machine scheduling
Shunji Tanaka, Shuji Fujikuma and Mituhiko Araki

Technical session 6B: General model for scheduling and assignment problem

[6B1] Decomposition of Petri nets for solving general scheduling problems
Tatsushi Nishi, Ryota Maeno and Masami Konishi

[6B2] An iterated local search algorithm for the multi-resource generalized assignment problem with flexible assignment cost
Toshihide Ibaraki, Akihiro Ishikawa, Hiroshi Nagamochi, Koji Nonobe and Mutsunori Yagiura

[6B3] A unified modeling and solution principle for fine scheduling
Kenji Muramatsu

18:00--19:30

Banquet

Thursday, July 20

9:00--10:00

Technical session 7A: Machine and shop scheduling 2

[7A1] Real-time machine scheduling with variable durations
Yihua Li

[7A2] A heuristic scheduling algorithm for multi-stage job-shop process with crane handling
Takashi Tanizaki, Takayoshi Tamura, Hideaki Sakai, Yutaka Takahashi and Taichi Imai

Technical session 7B: Supply chain

[7B1] Evolutional optimization on material ordering and inventory control of supply chain through incentive scheme
Kanit Prasetwattana, Yoshiaki Shimizu and Navee Chiadamrong

[7B2] Proposal of collaboration in supply chain for implementing mass customization
Shimpei Matsumoto, Nobuyuki Ueno, Koji Okuhara and Hiroaki Ishii

---

10:10--11:10

Technical session 8A: Production control

[8A1] Multiagent based production control to prevent capacity loss during failures
Rajesh Gautam and Kazuo Miyashita

[8A2] Base stock policy in a join-type production line with advanced demand information
Mikihiko Hiraiwa, Satoshi Tsubouchi and Koichi Nakade

Technical session 8B: Customer orientation

[8B1] Production planning system for implementing mass customization by using particle swarm optimization
Eri Domoto, Koji Okuhara, Nobuyuki Ueno and Hiroaki Ishii

[8B2] Proposed method for recommending goods using a mathematical planning model
Masahiko Ishino, Naokazu Yamaki, Teruhisa Ichikawa and Tadanori Mizuno

---

11:20--12:20

Keynote speech

[K3] Cyclic machine scheduling: A general framework
Peter Brucker and Thomas Kampmeyer

12:20--12:30

Closing session

Keynote Speech

Tuesday, July 18, 13:30-14:30

Gate Scheduling at Airports

Ulrich Dorndorf* and Erwin Pesch**
***INFORM GmbH**
****Institute of Information Systems, University of Siegen, Germany**

Abstract: Flight-gate scheduling is concerned with finding an assignment of flights to terminal or ramp positions, called gates, and an assignment of the start and completion times of the processing of a flight at its position. A good assignment may reduce the number of aircraft tows required and may lead to reduced setup times for several ground service activities on the ramp as well as in the terminal.
The key idea behind the model presented here is to look at the problem as a modified multi-mode resource-constrained project scheduling problem with a multi-criteria objective function. The most important goals are the maximization of a total flight-gate preference value and the minimization of the number of tows. The basic optimization algorithm is a truncated branch-and-bound procedure that branches over gate assignments and the disjunctive constraints used to model the capacity restrictions of the disjunctive resources (gates). The algorithm uses constraint propagation techniques to reduce the search space. To cope with large practical problems within the order of magnitude of thousand flights per day, the problem is decomposed into loosely coupled subproblems using a new generic problem partitioning technique. The subproblems are used within a layered branch-and-bound approach: The search tree is conceptually split into layers that correspond to the subproblems. In each layer, only decision variables of the current subproblem are selected for branching; limited backtracking is performed within the current layer before proceeding to the next layer. Initial solutions obtained in this way are iteratively improved using a Large Neighbourhood Search technique that relaxes some of the decisions and uses the branch-and-bound algorithm to reform the relaxed part of the solution at a lower cost. The model and algorithm have been evaluated using small manually designed test cases as well as two weeks of a real-life flight schedule from a large international airport. A comparison of the computational results with a rule based approach, as often used in commercial systems, shows that the algorithm greatly improves the solution quality.

Wednesday, July 19, 11:40-12:40

Production Scheduling to Decrease Transportation Costs

Kathryn E. Stecke
School of Management, University of Texas at Dallas, USA.

Abstract: When make-to-order manufacturing company adopts a commit-to-delivery business mode, it commits a delivery due date for an order and is responsible for the shipping cost. Without loss of generality, we consider that transportation is done by a third party logistics company such as FedEx or UPS, which provides multiple shipping modes such as overnight, one-day, two-day delivery, and more. When the transportation time has to be short, clearly shipping cost is more expen-

sive than it could have been. How should a company schedule production for all accepted orders so that the company can leave enough transportation time for orders to take slow shipping modes to reduce the shipping cost? We study this problem of integrating the production and transportation functions for a manufacturing company producing a variety of customized products in a make-to-order environment with a commit-to-delivery mode of business.
Various realistic scenarios are investigated, in increasing order of complexity. When partial delivery is allowed by customers, we provide both an MIP model and a minimum cost flow model. We show that nonpreemptive EDD production schedules are optimal when partial delivery is allowed and shipping cost is a decreasing convex function with transportation time. When partial delivery is not allowed, we develop an MIP model and prove that the problem is NP-hard. An efficient heuristic algorithm with polynomial computation time is provided for the NP-hard problem. It gives near-optimal production schedules, as shown via many numerical experiments. We also provide models and analysis for order scenarios where shipping cost accounts for customer locations and quantity discounts.

Thursday, July 20, 11:20-12:20

Cyclic Machine Scheduling: A General Framework

Peter Brucker and Thomas Kampmeyer
University of Osnabrueck, Germany

Abstract: Cyclic versions of job-shop (or flow-shop) scheduling problems with special features like positive and negative time-lags or blocking and non-blocking situations are considered. Furthermore, transportation may be taken into account. The objective is to minimize the cycle time. The model covers different cyclic versions of the job-shop problem found in the literature, robotic cell problems, and the single hoist scheduling problem. It is shown that all these problems can be formulated as mixed integer linear programs which have a common structure. Small instances are solved with CPLEX. For larger instances tabu search procedures have been developed. The same concepts can be used to solve cyclic scheduling problems with identical parallel machines and tool transportation between the machines, and computer pipelining problems.

なお，最終日 7 月 20 日（木）11:20〜12:20 の Peter Brucker 氏による招待講演は，どなたでも無料で聴講頂けます.

Peter Brucker 氏は，スケジューリングに関する標準的な教科書を書かれている著名な方です．スケジューリングに興味のある学生の方など，多数の皆様のご参加をお待ちしております.

今月の編集担当者
軽野義行 （京都工芸繊維大学）