



研究部会報告

● サプライチェーン戦略 ●

部会 URL : <http://scsr.jp/>

・第21回

日 時 : 2014年4月22日(火) 18:30~20:30

場 所 : 青山学院大学総研ビル9階16会議室

出席者 : 29名

テーマと講師 :

「ビジネスパーソンのためのOR教育: ~ダブル
ループモデルとSCMを軸にしたOR教育の提案~」
高井英造 ((株)フレームワークス特別技術顧問)

・第22回

日 時 : 2014年5月27日(火) 18:30~20:30

場 所 : (株)富士通総研本社事務所大会議室

出席者 : 15名

テーマと講師 :

「ローカルサーチ法による次世代数理計画法システムとその適用事例」
宮崎知明 (MSI(株)技術顧問・数理モデリング研究所所長)

・第23回

日 時 : 2014年6月24日(火) 18:30~20:30

場 所 : 青山学院大学総研ビル9階16会議室

出席者 : 35名

テーマと講師 :

「新しい小売形態オムニチャンネルを支えるサプライ
チェーン」
渡辺重光 ((株)フレームワークス代表取締役会長)

・第24回

日 時 : 2014年7月22日(火) 18:30~20:30

場 所 : 青山学院大学総研ビル9階16会議室

出席者 : 28名

テーマと講師 :

「海外物流インフラの現状と物流政策シミュレーション」
柴崎隆一 (一財)国際臨海開発研究センター (OCDI,
国土交通省より出向)

* 詳細はいずれの回も上記部会 URL に掲載。

● OR普及のためのモチベーション教育 ● ● 複雑系とOR ●

・第7回合同部会

日 時 : 2014年7月31日(木) 18:00~20:00

場 所 : 小樽商科大学札幌サテライト小講義室

出席者 : 11名

テーマと講師, 及び概要 :

(1) 「イベント情報推薦システムの開発と運用」

川村秀憲 (北海道大学)

イベント情報配信推薦における理論, および実践について講演された. 推薦アルゴリズムでは, 協調フィルタリングをベースとし, 複数のアルゴリズムをハイブリッド化する方法について提案された. また, それらを応用したイベント情報配信サービスの運用と実績について説明された.

(2) 「観光情報学とOR」

長尾光悦 (北海道情報大学)

観光情報学とORとの関連性について説明が行われた. 続いて, 観光情報学における研究事例について解説が行われた. GPSを利用した旅行者の動態調査方法, 風評被害対策に向けたメディア情報の分析, 観光行動によるメンタルヘルス改善効果の検証の研究事例が紹介され, 今後の展開について考察がなされた.

● 意思決定法 ●

・第29回

日 時 : 2014年8月4日(月) 16:00~18:00

場 所 : 名城大学名駅サテライトMSAT会議室 (名古屋市中村区名駅3-26-8名古屋駅前桜通ビル13階)

出席者 : 5名

テーマと講師, 及び概要 :

(1) 「三角図インターフェースを用いた一対比較法の分析と拡張」

水野隆文 (名城大学), 田地宏一 (名古屋大学)

AHPにおける一対比較法において, 一対比較行列の要素を視覚的に提示する三角図を用いた三者比較に基づくインターフェースを提案した. 三角図と一対比較行列および固有ベクトルとの整合性, またC.I.値との関係について初等幾何学および数値例を用いた分析が紹介されたあと, 提案されたインターフェースのメリットと, 従来のAHPの中での利用法について議論

がなされた。

- (2) 「職場モビリティマネジメントの推進が従業員の意識に与える効果について」

杉浦晶子 (名古屋大学)

職場モビリティ・マネジメントとは、マイカーから公共交通機関や徒歩・自転車など低環境負荷な通勤手段に転換することを意図したアンケートとそのフィードバックを基礎にした活動である。本報告では、四日市コンビナートでの職場モビリティマネジメントの実施例に基づき、従業員の環境配慮意識にどのような影響を与えるかについて詳細な報告がなされた。また、低環境負荷な交通手段の促進については、職場の立地条件よりも居住地の立地条件が影響しているのではないかなどの議論が交わされた。

● 評価のOR ●

部会 URL : <http://www-sys.ist.osaka-u.ac.jp/hyoka/>

・第60回

日 時 : 2014年8月6日 (水) 9:30~11:50

場 所 : 斜里町公民館 (ゆめホール知床・第1会議室)

出席者 : 14名

テーマと講師、及び概要 :

- (1) 「An Illustrated Guide to the ANALYTIC HIERARCHY PROCESS and the ANALYTIC NETWORK PROCESS」

関谷和之 (静岡大学大学院工学研究科)

AHPとその発展形であるANPについて、それらの評価手順と基本原理を、いくつかの例題を通して説明した。特に、これらの分析に現れる非負行列の性質はペロン・フロベニウス定理として知られていること、そして、その定理を拡張した性質はANPの有効性において本質的な役割を果たすことが報告された。

- (2) 「DEAとスポーツチーム・選手の評価」

廣津信義 (順天堂大学・大学院スポーツ健康科学研究科)

DEAに関する基礎概念をJリーグのデータを利用して紹介し、次に、スポーツへのDEA適用、取り分け野球、サッカーに関する既存研究が盛んであることが報告された。DEAを基礎として近年開発されている格付け手法、ランキングを2013年度Jリーグデータに適用し、その分析結果を紹介した。

● 信頼性 ●

部会 URL : <http://www.comp.sd.tmu.ac.jp/xiao/socialactivity/index.html>

・第3回

日 時 : 2014年8月8日 (金) 10:30~12:00

場 所 : 広島大学東広島キャンパス工学部第二類A1棟A1-111会議室

出席者 : 25名

テーマと講師、及び概要 :

「Bridging the Gap: Building Dependable Software Systems」

Dr. Mohammad Zulkernine (School of Computing and Electrical and Computer Engineering (Cross-appointed) Queen's University, Canada)

Dependable software system is the key ingredient to success for most organizations in today's world that is heavily dependent on information technology. This talk will discuss some of the research activities on techniques and methodologies for building and monitoring dependable software systems conducted within the Queen's Reliable Software Technology (QRST) research group. The talk will focus on bridging some of the important gaps in the area of software reliability and security such as software building and monitoring, software fault/failure and security vulnerability/intrusion, software behavioral monitoring and intrusion detection in the context of software engineering and security engineering.

・第4回 (中国・四国支部の支部事業「広島国際セミナー2014 (ISS2014)」との共催)

日 時 : 2014年8月19日 (火) 10:00~16:50

場 所 : 広島大学東広島キャンパス工学部第二類A1棟A1-111会議室

出席者 : 22名

テーマと講師、及び概要 :

- (1) 「Survivability Quantification for Networks」

Prof. Kishor Trivedi (Duke University, USA)

Survivability is critical attribute of modern computer and communication systems. The assessment of survivability is mostly performed in a qualitative manner and thus cannot meet the need for more precise and solid evaluation of

service loss or degradation in presence of failure/attack/disaster. This talk addresses the current research status of quantification of survivability. First we carefully define survivability and contrast it with traditional measures such as reliability, availability and performability. We then discuss probabilistic models for the quantification of survivability based on our chosen definition. Next, two case studies are presented to illustrate our approach. One case study is about the quantitative evaluation of several survivable architectures for the telephone access network. Hierarchical models are developed to derive various survivability measures. Numerical results are provided to show how a comprehensive understanding of the system behavior after failure can be achieved through such models. The second case study deals with the survivability quantification of communication networks.

(2) [A Modified Krylov Subspace Approximation Method for Transient Solutions of Continuous-Time Markov Chain]

Prof. Hiroyuki Okamura (Hiroshima University, Japan)

This talk discusses Krylov subspace approximation for transient solutions of continuous-time Markov chains (CTMCs). The CTMC is a powerful method to evaluate quantitative system performance based on state-based stochastic models. In general, the transient solution of CTMC can be represented by the matrix exponential function. However, it is computationally difficult to solve the matrix exponential function in the case of a large CTMC. Saad (1992) presented Krylov subspace approximation for the matrix exponential function. This is one of the most promising methods to compute the transient solution of large-sized CTMCs. In the paper, we propose the modified Krylov subspace approximation for transient solutions of CTMCs by using the stationary distribution. Concretely, this paper reveals the relationship between the uniformization for CTMCs and Krylov subspace approximation mathe-

matically. According to the relationship, the modified Krylov subspace approximation is proposed by the idea behind the modified uniformization.

(3) [Stochastic Evaluation Methods of Multi-State Systems with Partially Ordered State Spaces]

Prof. Fumio Ohi (Nagoya Institute of Technology, Japan)

A well known model of a binary state system assumes state spaces to be binary as $\{0,1\}$, where 0 and 1 respectively mean failure and normal states. We, however, may frequently observe cases in which components and systems can take intermediate states between total failure and perfectly functioning states, which require us to develop a theory of multi-state systems and stochastic evaluation methods. Recently many researchers have studied this case and proposed some effective methods for stochastic evaluation of systems, but many of them assume the totally ordered state spaces. In this presentation, showing a definition of multi-state systems for the case of partially ordered state spaces, we summarize some methods for stochastic evaluation of the system at a time slice or in a steady state as the inclusion and exclusion method, Boolean method, stochastic bounds by minimal and maximal state vectors, stochastic bounds by series and parallel decomposition of the multi-state system and stochastic bounds via modular decomposition.

(4) [Reliability Assurance and PHM: Key Challenges]

Prof. Ming J. Zuo (University of Alberta, Canada)

This talk addresses key challenges in assurance of the reliability of systems in continuous operation utilizing condition monitoring data. Key issues include quantification of the health status of system in operation and the relationship between health indicators and the predicted remaining useful life. The covered research aspects include fault detection, fault assessment, fault diagnosis, deterioration trend prediction, reliability

assessment, maintenance optimization models and methods, and decision-making tools for inspection, maintenance, and operation.

(5) 「Simulation-based Reliability and Maintenance Optimization for Multi-Unit Systems」

Prof. Won Y. Yun (Pusan National University, Korea)

In this talk, I introduce simulation-based Reliability and Maintenance optimization problems for multi-unit systems. System operational availability and life cycle cost are considered as optimization criteria. Meta-heuristics and heuristic techniques are used to find the near optimal solutions in the optimization problems. Three optimization topics are discussed; Firstly, I explain a reliability and maintainability optimization problem for a searching system and want to determine the optimal value of MTBF (Mean Time between Failures), MTTR (Mean Time to Repair) and ALDT (Administrative and Logistics Delay Time) of all units that minimize the life cycle cost and satisfy the target system availability. Secondly, I talk about a preventive maintenance problem for KTX (Korean Train eXpress) because system availability can be improved through effective preventive maintenance. The objective is to determine the preventive maintenance intervals of units in the system optimally. Finally, I introduce an inspection optimization problem for one-shot systems with two types of units where Type 1 units are failed at random times and Type 2 units are degraded with time. The interval availability and life cycle cost are used as optimization criteria and the optimal inspection interval is obtained for a one-shot system with given replacement times of Type 2 units. Next, an inspection scheduling problem is studied for one-shot systems under the constraint of maintenance resources.

(6) 「Dynamic Degradation Modelling in Remaining Useful Life Estimation」

Prof. Wenbin Wang (University of Science and Technology Beijing, China)

Remaining useful life (RUL) estimation is

regarded as one of the most central components in prognostics and health management (PHM). Accurate RUL estimation can enable failure prevention in a more controllable manner in that effective maintenance can be executed in appropriate time to correct impending faults. In this talk we consider the problem of estimating the RUL from observed degradation data for a general system. A degradation path-dependent approach for RUL estimation is presented through the combination of Bayesian updating and expectation maximization (EM) algorithm. The use of both Bayesian updating and EM algorithm to update the model parameters and RUL distribution at the time obtaining a newly observed data is a novel contribution of this research, which makes the estimated RUL depend on the observed degradation data history. As two specific cases, a linear degradation model and an exponential-based degradation model are considered to illustrate the implementation of our presented approach. A major contribution under these two special cases is that our approach can obtain an exact and closed-form RUL distribution respectively, and the moment of the obtained RUL distribution from our presented approach exists. This contrasts sharply with the approximated results obtained in the literature for the same cases. To our knowledge, the RUL estimation approach presented in this talk for the two special cases is the only one that can provide an exact and closed-form RUL distribution utilizing the monitoring history. Finally, numerical examples for RUL estimation and a practical case study for condition-based replacement decision making with comparison to a previously reported approach are provided to substantiate the superiority of the proposed model.

(7) 「Empirical Software Reliability Engineering」

Prof. Tadashi Dohi (Hiroshima University, Japan)

The empirical software engineering is becoming much popular and is useful to quantify the software development process via the measurement-based

approach. Especially, an effective utilization of software metrics measured in the development process plays a central role to evaluate the engineering aspect of software development. On the other hand, the software reliability engineering aims at evaluating the quantitative software product reliability, which is defined as the probability that the software failure does not occur in the operational phase, but has just focused on the curve fitting of the cumulative number of software faults from the software fault count data. In other words, the software reliability engineering community has often missed to utilize the software metrics effectively during the last three decades. In this talk, I summarize the metrics-based software reliability modeling framework and give a significant approach to bridge between the software metrics data and the software reliability assessment. The fundamental idea is to apply non-trivial regression-based models to represent the software failure rate. Throughout illustrative examples with actual software development project data, I show that the metrics-based software reliability assessment technique outperforms the existing

software fault count methods. I also refer to the reliability assessment for incremental software development, arising in the well-known agile software development paradigm.

● リーンマネジメントシステム ●

・第3回

日時：2014年9月9日（火）16:30~18:30

場所：名古屋国鉄会館7階会議室「ひかり」

出席者：8名

テーマと講師、及び概要：

「不確実環境下の協調型SCMにおける最適在庫政策について」

佐藤公俊（秋田県立大学）

本講演では、天候不順や原材料の供給遅延などによる生産の不確実性に直面した生産者と小売業者の2企業からなるサプライチェーンマネジメントを対象とし、企業間で価格や取引量による協調を基に、生産者は受注量をもとに生産在庫費用の最小化を目的とする生産方策を決定し、小売業者は生産者との間で生産方策を共有し、生産および需要リスクの下で発注量を決定するモデルが提案され、協調が総費用の低減につながる事が示された。