the type of repair (perfect or minimal) depends on the type of failure.

2) A Generalized Age Replacement Policy with Random Leadtime, Shih-Huei Shyu, Natl. Taiwan Inst. of Tech., Dept. of Indus Mgmt., Taipei, Taiwan, ROC, Ta-Mou T. Chen

A generalized age replacement policy with age-dependent minimal repair and random leadtime is considered. A model for the expected cost per unit time based on the stochastic behavior of the assumed system, reflecting the cost of storing a spare as well as the cost of system downtime is developed. The determination of the minimum cost policy time is described and illustrated. As the model and its analysis are general, several existing results are shown to be subsumed by the defined model.

3) Bayesian Minimal Repair Policy During Warranty Interval, Elmira Popova, Univ. of TX, OR/IE Group, Dept. of Mech. Eng., ETC 5120, Austin, TX 78712, elmira@mail.utexas.edu

A fixed length warranty period is assumed in this paper. A maintenance policy which consists of minimal repair and preventive maintenance is analyzed for the case of known and unknown failure parameters of the item's lifetime distribution. For the 2nd case, two types of Bayesian policies are proposed. An extensive simulation study comparing the performance of these maintenance policies is performed.

MD26 Performance Issues in Communication Networks
Sponsor: Applied Probability Section
Chair: Takis Konstantopoulos, Univ. of TX, ECE Dept., Austin, TX 78712, takis@alea.ece.utexas.edu

1) Measuring Quality of Service: Algorithms & Implementation, Stephan Roberts, Univ. of CA, EECS Dept., Berkeley, CA 94720, Matt Siler, Jean Walrand

A communication network can use traffic and resource measurements to improve its operations and satisfy user QoS requirements. We discuss what the network should measure and how it can measure it. We study estimation algorithms that take hardware limitations into account. These limitations are on the processing speed and on the register space of the monitoring system.

2) Representing Capacity for Routing in Large-Scale Networks, Gustavo De Veciana, Univ. of TX, ECE Dept., Austin, TX 78712, Michael Montgomery, W. Yang

We introduce and contrast 2 approaches to represent the available capacity of a subnetwork with a view on advertising the network state for hierarchical source routing algorithms. The first combines prediction with topology approximation while the second deals with an implicit notion of congestion, potentially useful for high-level adaptive routing.

3) The Constant Bit Rate Channel in Wired Broadband Networks, George Kesidis, Univ. of Waterloo, ECE Dept., Waterloo, Ontario, N2L 3G1, Canada

A backbone B-ISDN focuses on a CBRS and lightweight best-effort services. We describe an input-queued switch with a guaranteed-rate property using a Stefan-Dejong connection less-traffic arbitration and hierarchical round-robin scheduling. Best-effort services are designed for IP traffic. The guaranteed-rate property is extended to cover end-to-end network properties over CBRS channels.

4) Broadcast-Based Information Delivery to Massive User Populations, Leandros Tassiulas, Univ. of MD, EE Dept., College Park, MD 20742, Chi-Juan Su

Broadcast data delivery is an efficient way of distributing information to a large user population in an asymptotic communication environment where traditional client-to-server communication is obsolete. Major issues discussed are the bandwidth on the broadcast channel so as to minimize the average latency of user requests and user's memory management...

MD27 Fuzzy Sets & Fuzzy Decision Systems
Cluster: AI & OR Techniques in Project Management Decision Analysis
Invited Session
Chair: Augustine O. Esogbue, GA Inst. of Tech., School of ISYE, 225 North Avenue, Atlanta, GA 30332-0205, Augustine Esogbue@isye.gatech.edu

1) Some Intelligent Control Applications to Manufacturing, Augustine O. Esogbue, GA Inst. of Tech., School of ISYE, 225 North Av, Atlanta, GA 30332-0205, Augustine.esogbue@isye.gatech.edu

Fuzzy control has proven effective for complex, nonlinear, imprecisely-defined processes for which standard control models are either inefficient or impractical. Advances in manufacturing and computer technology have created a large number of complex computer-integrated manufacturing systems which can benefit from the integration of fuzzy logic, neural networks and optimization techniques.

2) Fuzzy Sets, Fuzzy Relations & Economic Predictions, Benjoe A. Juliano, Coastal Carolina University

Experienced economists often express imprecision but highly relevant economic predictions in vague terms. The applicability of fuzzy sets and fuzzy relations in economics is presented. The approach simplifies the process of expressing knowledge from expert economists facilitating the design of DSS for economic predictions.

3) Classification of Uncertainty in Information Warfare, Pamela McCauley-Bell, Univ. of Central FL, Dept. of IE/MS, PO Box 160450, Orlando, FL 32816-2450, bell@iems.engr.ucf.edu

We discuss a methodology for uncertainty management in IW and define a high level model for information classification within IW. The uncertainty is characterized as one of three types: nonspecificity, discord/strife or fuzziness. An approach for obtaining the corresponding linguistic values and numeric representations is presented.

4) Database Mining Supported by Approximate Reasoning Techniques, Lawrence J. Mazzuc, Univ. of Cincinnati, Cincinnati, OH 45221, mazzuc@uc.edu

Database mining seeks to recognize previously unknown, interesting information in a database. A computational approach to unguided discovery is explored. It is based on identifying relationships having the most information value. Both crisp and non-crisp data are subject to discovery. There is a concern with coherent, understandable session.


The contribution of this paper is to generate an optimal, possibly locally optimal, solution to the hierarchical design problem using fuzzy possibilistic programming. The solution is optimized using a genetic algorithm in terms of both the value of its fuzzy sets and the level of imprecision of each fuzzy set.

MD28 Applications of Integer Programming in Scheduling
Cluster: Integer Programming
Invited Session
Chair: Renato E. de Matta, Univ. of IA, Coll. of Bus. Admin., 108 PBAB, Iowa City, IA 52242, renato-dematta@uiowa.edu

1) A Job Shop Problem in the Process Industry, Monique Guignard-Spielberg, Univ. of PA, Dept. of Decision Sci., Wharton Sch., 1320 STH-DH, Philadelphia, PA 19104-6366, guignard@dandzig.wharton.upenn.edu, Kurt Spielberg, Huan Yan

We discuss modeling issues for chemical production in batches. One minimizes the time needed to produce the demand. We propose a disaggregated model with a 0 objective function and solve it for increasing makespan values.

2) An Application of Lagrangean Decomposition to the Scheduling of Hot Charged Rolling in Steel Production, Dennis L. Bricker, Univ. of IA, Dept. of IE, Iowa City, IA 52242, dbricker@lesean.uiowa.edu, Ta-Cheng Chen, Soo Y. Chang

A scheduling problem for HCR in the continuous casting process, requiring both grouping and sequencing within each group, is modeled as a degree-constrained minimum spanning tree problem. We compare several algorithms employing Lagrangian decomposition and several heuristic methods.

3) Crew Scheduling for Multiple Intercity Bus Fleets, Emmanuel Peters, Univ. of IA, MS Dept., Iowa City, IA 52242, emmanuel-peters@uiowa.edu, Renato E. de Matta, Warren J. Boe

A crew scheduling problem with multiple bus fleets and crew types is modeled as a set covering problem. We find the minimal cost crew schedule subject to labor agreement restrictions and fleet schedules. We propose a column generation-based approach to solve the problem. Computational results are presented.

4) Minimizing Total Job Waiting Time in a Two-Stage Flow Shop, Rodney Traub, Univ. of IA, Coll. of Bus. Admin., Iowa City, IA 52242, Renato E. de Matta

We study a 2-stage process where products are to be produced in a pre-specified sequence in the second stage. Due to setups, jobs must be sequenced differently on the first stage. Our objective is to develop a sequence on the first stage which minimizes the total job waiting time between stages.
Dallas

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WELCOME FROM THE GENERAL CHAIR

To the members of INFORMS, guests and other attendees, let me welcome you to Dallas and the great state of Texas. The Dallas '97 meeting starts early on Sunday, October 26, with a full slate of technical sessions and continues through Wednesday noon with nonstop activities. Approximately 470 technical sessions will be held with over 1,600 individual presentations. Twenty tutorials are scheduled, and we are pleased to have George Kozmetsky and Bill Cooper for plenary speakers. The Beale Keynote Address is given by A. H. Christer and the Edelman Keynote address presents the winner of the spring Edelman competition for the practice of OR/MS. Certainly professionals in Operations Research or Management Science, persons interested in the application of the OR/MS methods in practical settings, students hoping to join the profession or individuals just wondering what this field is about will find plenty to do.

Throughout program we have illustrations of the theme of the meeting, "The Evolving Synergy "OR/MS and Digital Technology". There is no question that our field is growing and thriving right along with explosive developments in digital technology. This is particularly illustrated by the new areas such as telecommunications, but the contributions of computers are no less apparent in the methodology areas such as integer programming.

I am particularly pleased with the balance in the program between the focus of our logo, Applications, Education and Research. We have particularly strong sessions stressing applications in transportation, manufacturing, health, management, telecommunications and the military. One track running through the entire meeting is concerned with education. Training workshops will be held before and during the meeting. We preserve our traditional link to theory through a variety of tracks emphasizing research in methodology.

The Hyatt Regency is very attractive and its meeting rooms are large, ensuring that participants will find a pleasant experience in living areas and meeting facilities. In addition to the technical program, there are many opportunities for making and renewing contacts within the profession. Students are especially accommodated with activities hosted by the Student Activities Committee including a room designated for students to gather. We welcome spouses and other guests to the guest program. The Exhibit Area and an Employment Program allow interaction with commercial businesses and potential employers. The General Reception, held in the Union Station adjacent to the hotel, emphasizes a Southwestern and Texas theme through Tex-Mex food, barbecues and a taste of country-western music. Don Walker and his Pure Texas Band provide the entertainment. For those prone to wander away from the hotel, the Dallas area offers many alternative diversions.

For the members of the local committee this is the culmination of two years of effort, and I'm sure that all will be relieved at its passing. My thanks to each one of you for your support. Of particular note are the efforts of Jon Ball and Patrick Jallat in organizing the program, Andy Boyd in recruiting the tutorial speakers and Jeff Pennington, who is handling the Dallas arrangements. Many of you have spoken to our secretary Linda Halliday, supported by the Mechanical Engineering Department at the University of Texas. She has been the glue holding it all together.

One lasting impression for me is the large number of people involved in the planning and implementation of this meeting. The INFORMS Meetings Committee led by Tom Gullage provides the policies and carries the collected wisdom associated with more than fifty years of meetings. The INFORMS Rhode Island Office provides invaluable staff support lead by Julie Eldridge and Ghini McCaig. The many cluster chairs, session chairs and the invited and contributed paper authors provide the basis for our technical program. In addition we have keynote and plenary speakers, exhibitors, student assistants and meeting staff. This meeting is in fact the culmination of the efforts of approximately 1700 people which comprise the majority of the attendees. Thanks to all of you. If the meeting is a success, it is due to your efforts.