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Editorial Statements

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EDITORIAL STATEMENTS

EDITOR'S STATEMENT

H. DONALD RATLIFF, EDITOR

Operations Research has as its goal the publication of significant, new operations research knowledge related to: underlying data based principles of operational science, observations and modeling operations systems, contributions to the methods and models of operations research, case histories of applications, review articles, and discussions of aspects of such subjects as the administrative environment, the history, policy, practice, future, or arenas of application of operations research. The Journal is a rigorously refereed publication.

The Journal strives to have readers feel that there is something of interest to them in every issue. To aid in this effort, the Journal requires a "Statement of Contribution" with each submission. This statement should include: why the topic addressed is important, what specific contributions the paper makes, what the author believes to be the basis for publication, and the author's assessment of both the near and long-term implications of the contribution. This statement of contribution will accompany the paper through the review process and will serve as the basis for the "In This Issue" column if the paper is published. A copy of this form will be placed in nearly every issue of the Journal, and it appears for the first time in the back of this issue among the standard pages.

The following are illustrations of how a paper might contribute to our knowledge of operations research:

- Help to structure a new problem domain;
- Provide new insight about the topic being studied;
- Introduce innovative methodology and methods of analysis;
- Provide lessons of transferable value; and/or
- Illustrate a clever or novel use of some methodology.

Our area editor structure is a recognition of the breadth of the Journal's coverage. This structure puts editorial decisions in the hands of experts who can best assess the contributions of the submitted manuscripts. While I have the final decision with regard to what is published, area editors have considerable latitude to either accept or reject papers. They are responsible for seeing that each submission is promptly and appropriately reviewed. The area editor decides when

the evaluation process is complete, and if a paper meets the criteria for acceptance.

The area editor selects an associate editor to be responsible for getting a paper refereed. In general, authors do not know the identity of the person handling the paper. The associate editor is responsible for obtaining two to three reviews for each paper. These reports together with the associate editor's recommendation are provided to the area editor for consideration.

Our definition of areas for the Journal is not meant to be restrictive in any way. Papers in traditional areas of operations research, which do not have a designated area editor, should be submitted directly to the editor. We also want to make every effort to encourage the submission of papers in new or nontraditional areas and have designated an area editor to handle such papers (see the editorial statement for New or Nontraditional Areas).

The editorial board has the following areas:

Computing
Decision Analysis, Bargaining and Negotiation
Distribution, Transportation and Logistics
Manufacturing, Production and Scheduling
Military Applications
New or Nontraditional Areas
Optimization
OR Forum
OR Practice
Services
Simulation
Stochastic Processes and Their Applications

In addition, we are in the process of establishing an area editor to encourage more review and expository papers.

As in the past, authors should submit manuscripts directly to an area editor. Only when a paper is not covered by one of the areas or if an author is unsure about which area is most appropriate, should it be sent to the editor. Four copies of a paper (plus a Statement of Contribution and a Copyright Transfer Agreement) are required upon initial submission.

Papers may be returned without refereeing if the

area editor feels that the paper is poorly written or otherwise inappropriate for the Journal. While it is not my intention to discuss writing mechanics in this forum, a well written, concise paper usually will go through the review process more quickly. Sometimes, lengthy review times may be caused inadvertently by authors themselves because of poorly prepared material.

In this regard, the abstract and introduction of a paper should set the stage for the remaining sections. Our goal is to make published papers as readable as possible for our broadbased membership, and in particular, we hope that at least these two sections can be read and understood by any ORSA member. The abstract should be a self-contained paragraph that summarizes the problem, principal results and conclusions; it should not contain formulas, mathematical notation or exceed 200 words. The introduction should clearly state the problem, the results to be found in the paper and their significance to the operations research community.

Once a paper is submitted for review, we have developed a system to track the manuscript. This OR

data base helps us follow the progress of a paper from submission to publication. Papers that require longer than 6 months to review, sometimes because of the difficulty of the material, can be expedited. Most papers are handled in less than 3 months, however, some papers require a year or more to process. We are working to shorten review time.

I am apprised to a paper's progress through status reports submitted by each area editor. The status information is logged, and it is easy to answer an author's queries. Any problems or potential conflicts in the refereeing process are brought to light and may be solved with dispatch.

In the statements that follow, each area editor has set out a definition of their area—the broadbased topics they are seeking papers in as well as their view of that segment of operations research. We are pleased to publish these statements as a guide for potential authors. Also, they outline some new areas and further refine some of the older, more traditional areas. In addition, editorial statements have not been published since January–February 1983, and it is time for a fresh look at each area.

AREA EDITOR STATEMENTS

COMPUTING

Jeffery L. Kennington, Area Editor

COMPUTING will publish original papers in the operations research area that primarily convey results from practical computational experience. Subjects include the following: Computational investigations on novel computer hardware, performance measurements on state-of-the-art systems, software engineering aspects of operations research software, new and innovative model management languages, and algorithm evaluation via computational experimentation.

DECISION ANALYSIS, BARGAINING AND NEGOTIATION

David Bell, Area Editor

We seek articles that increase our ability to provide constructive, pragmatic support to decision makers or that deepen our understanding of the fundamental principles underlying areas such as decision analysis, utility theory, goal programming, multiple criteria decision making, game theory, bargaining, negotiation, incentives, contracts, risk analysis, risk management, and conjoint measurement.

If the article describes an application, or a method of application, there should be something novel about it. The mere fact of implementation, while laudable, is insufficient reason for publication. Computer procedures, or algorithms that form the basis for computer procedures, must show clear potential for use in practice.

If the article describes a theory, or the further development of an existing theory, it must extend our understanding in a substantial way. If a development is new, but routine, it will not be published.

In general, the reader should be able to tell from the abstract whether the paper is worth reading (a conclusion that may well vary across readers). The introduction should confirm the problem setting, and say why the contribution is new and how it differs from earlier work. Articles should be written clearly, typed cleanly and, if at all possible, edited, before submission. In my experience, it is easier to correct brevity (by asking for amplification) than excessive length (which authors seem reluctant to cut).

The field has a long and celebrated history with luminaries stretching from Bernoulli, Bayes, Ramsey, von Neumann, and Morgenstern to Raiffa, Howard, Fishburn and Edwards. We seek to publish more papers in the same vein.

DISTRIBUTION, TRANSPORTATION AND LOGISTICS

Warren B. Powell, Area Editor

Operations Research recently instituted a new area entitled DISTRIBUTION, TRANSPORTATION and LOGISTICS, whose goal is to attract papers in transportation that emphasize the rich potential of the methods of operations research. Of particular interest are papers that pose challenging and interesting modeling problems, as opposed to the more classical mathematical or algorithmic papers that have become the mainstay of operations research.

The application of OR in transportation is becoming increasingly pervasive. Some of these applications involve relatively straightforward modeling of a system but give rise to difficult mathematical and algorithmic problems, such as in the solution of large set partitioning problems for crew scheduling. Others address the simulation and/or optimization of large, complex systems that require the resolution of challenging modeling issues to produce workable models. This latter area in particular, represents a “soft science” that is, nonetheless, of central importance to a successful implementation, and one which has not received sufficient attention or emphasis in the research literature.

Of particular interest, then, are papers that bring out this “art of approximating.” These might describe projects that involve solving relatively complex problems that require a creative modeling approach or a set of approximations to come up with a usable model. This does not mean that all contributions need to be applications papers per se, but rather, are papers where the *research* contribution is the development of creative and useful ways of representing a problem. Of course, the best proof of a good model is that it works in practice, but it is possible to make contributions to modeling without developing a commercial system. Papers will be evaluated on the basis of the creativeness of the model, the overall soundness of the formulation and the proposed algorithms, and finally, by a general intuitive feel that any experienced modeler possesses. The papers should demonstrate some maturity in the methodology, and in the important issues within the problem area.

The DISTRIBUTION, TRANSPORTATION and LOGISTICS area is not limited to papers where the modeling of a difficult problem is the central issue. Creative applications of and contributions to mathematical modeling and algorithm development that take advantage of the unique structure of transportation systems are also welcome. If the contribution is

felt to be of interest only to a narrow transportation segment, then a recommendation may be made to send the paper to a journal such as *Transportation Science*.

The range of application areas and associated methodologies is necessarily quite broad. Problem areas may include the routing and scheduling of transportation services, combined production and logistics management, equilibrium modeling, stochastic modeling of transportation systems, costing and pricing of transportation services, and problems arising in network design. These areas will entail methodologies from classical optimization, network algorithms, integer programming, stochastic programming and simulation. However, papers that primarily represent contributions to the relevant methodology, unless they particularly leverage the structure of problems arising in transportation, should be sent to Area Editors with the particular expertise to evaluate those contributions.

A separate class of papers that are of interest cover creative software implementations of methods that enhance their usability. Increasingly, the adoption of methods depends as much on their packaging as the effectiveness of the underlying model or algorithm. Examples in this area might involve the use of LISP machines or other artificial intelligence technologies, interactive optimization, or interactive graphics. The paper must, however, demonstrate a creative use of these technologies and play an easily recognizable role in bringing algorithmic or modeling techniques into the field. Papers in this area should emphasize *general* principles that were used in the design of the software, and should not read like a user’s manual or an advertisement for a new system.

Our goal is to solicit papers that currently fall outside of mainstream operations research, but which are of central importance in actual applications (the papers themselves, however, do not have to report on the real-world applications). If you have a paper that you feel may be appropriate, I will quickly review the submission and return it, if I feel the paper belongs elsewhere (possibly to a different area of *Operations Research*). This will help avoid long refereeing delays only to find that the paper is not suitable for the area.

MANUFACTURING, PRODUCTION AND SCHEDULING

**Gabriel R. Bitran and Michael J. Magazine,
Area Editors**

The growing importance of the manufacturing function in the survival of firms has led to increased

research activity in this vital area. We anticipate that *Operations Research* will play a significant role in the publication of relevant models and methods in this expanded field.

The area encompasses the full range of activities relating to the design, planning, and control of manufacturing systems. Manuscripts in recently emerging fields such as Kanban, just-in-time systems, flexible manufacturing systems, and computer integrated manufacturing are especially welcome as well as those in areas that are new and experimental. The area also includes other activities normally associated with operations management such as policies for producing, acquiring, storing and issuing stock for single-item, multi-item and aggregate inventory in simple or multi-echelon systems; management and scheduling of production, projects, job shops and personnel; quality control and reliability assurance; and materials management, warehousing, storage, distribution and requirements planning.

We welcome papers across the full spectrum from theory to practice. All papers must be well written and authors should attempt to write their manuscripts to reach the widest possible segment of the readers of *Operations Research*. It is important that insights gained from specific applications, models or problems be reported in a way that makes it clear how they contribute to more general situations. Empirical studies, conducted to test a theory or describe the behavior of systems and algorithms, are sought, but must be carefully designed with conclusions that are well thought out.

MILITARY APPLICATIONS

Marlin U. Thomas, Area Editor

This area seeks to attract papers with significant research findings in the broad arena relating to military and defense utilizing operations research. Such contributions must have an impact on resource management and policy development for the military. Included are methodological developments and models for analyzing and evaluating operations, logistics support and the management of military related activities. Of particular interest are papers containing modeling approaches and analytical formulations for improving our understanding of difficult military problems. Papers are also welcome that deal with manufacturing and service related activities that are peculiar to a military mission or function.

Both theoretical and applications oriented submissions are welcome in topics that include combat

modeling and war gaming, reliability, maintenance planning, search and detection, tactical and strategic force planning, logistical support systems, and acquisition planning. Issues of importance are the design and improvement of performance, productivity, economics, and cost effectiveness. Four types of submissions are envisioned as follows:

- (1) Significant applications utilizing operations research methods and techniques,
- (2) Resulting methodological developments for military applications,
- (3) Surveys of related contributions pertinent for military applications,
- (4) Contributions to operational science in the military area (see "Operations Research: The Next Decade," *Operations Research*, **36**, 619–37, 1988).

Submissions will be evaluated using the normal criteria for *Operations Research* which includes relevancy to the field of OR and the area of military applications, validity of approach and underlying assumptions, and the clarity of presentation.

NEW OR NONTRADITIONAL AREAS

John J. Bartholdi III, Area Editor

One of the strengths of OR is its wide applicability. To help keep it vigorous and flexible, this area wants papers that introduce issues and techniques that are new and unusual for the OR community. We are looking for two types of papers. One will introduce readers to problems of other fields for which the techniques of OR seem appropriate; the other type of paper will apply OR to these problems.

We intend "new" and "nontraditional" in a strong sense: rather than mild variations to familiar problems, we want unusual papers that will stand out in the Journal. For example, we would be very interested in receiving manuscripts that apply OR to biology, physics, or psychology. In fact, we would be interested in receiving papers on just about any topic imaginable—except those that would be immediately recognized as OR!

We are willing to gamble on especially imaginative or provocative papers. We discourage papers that are merely hard to classify, are laden with jargon or are incremental improvements to familiar problems. We urge authors to be daring, speculative, vigorous, and skeptical. Look for problems anywhere but the OR literature and report to us!

OPTIMIZATION

Jan Karel Lenstra, Area Editor

Optimization plays a fundamental role throughout operations research. Indeed, the origin of the profession is commonly identified with the initial success of linear programming, which was due to the computational effectivity of the simplex method and the widespread applicability of the linear model. This seminal development was followed by the investigation of models and algorithms for nonlinear, integer, combinatorial, and stochastic optimization.

While the discipline of optimization has enjoyed a rapid maturation, the potential for further development and the enthusiasm characteristic of a young subject still persist. One need only witness the recent advances in network optimization, the excitement surrounding the investigation of interior point methods in linear programming, and the computational successes of polyhedral methods in combinatorial optimization. In the next decade, similar breakthroughs may be realized due to the increasing practicality of parallel computing as well as the continued application of the randomization principle in the design of approximation algorithms.

We welcome all significant contributions to the area of OPTIMIZATION in operations research. These contributions may concern the structural properties of models. They may describe the development of algorithms, whether these are designed to find guaranteed optima or reasonable approximations, and whether the analyses are based on an experimental, probabilistic or worst-case approach. On the other hand, they may discuss the development of modeling languages and other tools that are concerned with the relation between practical decision situations and theoretical optimization models. Finally, in addition to research papers, we welcome survey articles, which review recent developments in a specific area and present perspectives on the directions of future research.

OR FORUM

Hugh J. Miser, Area Editor

The OR FORUM section of *Operations Research* is the place where workers in operations research and management science can express responsible views about the history, present status, or future prospects of these subjects or the professional work associated with them. Contributions may be short or long, may comment on earlier material appearing in the Journal, or may introduce new subjects. Each submission will

be reviewed, but in a way appropriate to its content (which may not be in the classical norm of two independent referees). Since the principal aim of this section is to promote critical thought, views outside the mainstream of current professional thinking are particularly welcome.

OR PRACTICE

Michael H. Rothkopf, Area Editor

The OR PRACTICE section of *Operations Research* seeks to publish papers that operations research practitioners will find interesting, useful and accessible. This purpose has implications for the subject matter, the style of writing of material included in the section, and for the review procedure used for the material.

Subject matter of interest includes the following topics:

1. Reports on the practice of operations research that are significant, for example that
 - a. are nonroutine, novel, or unusual,
 - b. produced unusually dramatic results for users,
 - c. received great attention (e.g., in the popular press),
 - d. failed in an instructive manner, or
 - e. caused major changes in the orientation and approach of a major application effort.
2. Serious surveys and studies of the use, nonuse, or misuse of operations research in particular industries or of the use, nonuse, or misuse of particular operations research methods as well as scholarly discussions of the gaps and problems in operations research theory that significantly limit its potential for use, and
3. Practitioner-oriented tutorials, surveys, and evaluations of new or rapidly evolving technical areas and of computer programs and systems for making operations research methodology available.

Contributions to operations research theory that do not fall into one of these categories should be submitted to other sections of the Journal. While the OR PRACTICE section's definition of operations research is liberal, its definition of practice is strict. Practice implies a serious attempt to influence decisions, policies or practices.

All material in OR PRACTICE must be clearly written. Papers must be properly introduced so that operations research practitioners can anticipate quickly the remainder of their content and understand their context. Papers must not assume any mathematical or theoretical background not held by the preponderance of practitioners. This requirement does

not restrict the use of necessary but unfamiliar theory or mathematics, but it does place the burden on authors to describe clearly (not derive) any unfamiliar material. There is no formal restriction on the length of papers. Papers will be in the same style as those in the Articles Section of the Journal and each paper will be followed by brief professional biographies of its authors. Use of clearly written technical appendices is strongly encouraged. Clear thinking about the role of mathematical models in practice is just as necessary as mathematical correctness. Papers are expected to describe the actual experience in practice, not just the mathematics used, and to do so as explicitly as possible.

In order to reach its editorial objectives, the OR PRACTICE section of the Journal will follow somewhat different procedures from the rest of *Operations Research*. All associate editors dealing with submissions to the OR PRACTICE section will have had substantial experience as practitioners. None will have current editorial responsibilities for the research Articles Section of the Journal. Associate editors will solicit papers actively from practitioners. Submissions will be reviewed by at least two anonymous referees, one of whom will be a knowledgeable practitioner. Every referee will be supplied a copy of this statement of editorial policy. Part of the refereeing process will involve verification of claims of application and of benefits from application.

SERVICES

Richard C. Larson, Area Editor

Two thirds to three quarters of the U.S. economy is devoted to services. An often misunderstood collection of diverse industries, services include finance, insurance, retail trade, transportation, communications, public utilities and government. Basically services are whatever is left over after we subtract manufacturing, mining, construction, agriculture, forestry, and fisheries. Even in the latter group of activities, many internal processes are service-oriented. For instance, engineering and logistics are two services in support of manufacturing; fully 75% of the typical manufacturer's internal costs and external purchases are for services activities (Quinn 1988, in *Managing Innovation: Cases from the Services Industries*, p. 28).

While manufacturing productivity in the U.S. has grown at a healthy 3 to 4% during the last decade, services productivity has languished, producing negative growth in producer's services, retail trade, and health care. If U.S. services productivity had grown at the same rate as West Germany's between 1972 and

1983, the U.S. would have produced only 3.5 million new services jobs, not the 14.2 million actually recorded (Thurow 1988, *Services in the American Economy*). Meeting future demands for increased services will require alternatives to jobs growth, especially in a low unemployment economy.

A major source of productivity improvement in services is technology—both hardware and software technologies. Operations research, when implemented, usually appears as a software technology. Successful applications of operations research in services have been impressive, with important contributions in airlines, financial services, logistics, urban services, production related services, and utilities. Documented implementations often reveal impressive returns on investment. But OR market penetration in services remains low; the potential remains high.

Operations Research welcomes both applied and methodological papers motivated by concerns of services industries. Illustrative contextual areas include logistics, utilities, portfolio management, urban services, telecommunications, production-related services, and manpower planning in services. We encourage submissions in both *private* and *public sector* services.

As is customary with other editorial areas, there is bound to be some overlap between the SERVICES area and others, such as Distribution, Transportation, and Logistics; Stochastic Processes and Their Applications; and OR Practice. For instance, a paper reporting on an optimal dynamic seat pricing policy implemented on a major airline shares concerns of at least five editorial areas—the three just cited, plus Optimization, as well as SERVICES. Authors should select the area editor they deem most appropriate for their paper. The Journal's editors will forward the paper to a different area editor if they believe such a move creates a better match.

As Area Editor of SERVICES, I am particularly interested in methodological contributions (e.g., new models or algorithms) motivated by real concerns of real services; it's even better when there is an implementation experience to report. In the written manuscript, I welcome a description of the modeling process, including reports of false starts, data analysis, model refinement and constituency building among potential users. More generally, emerging concerns of operational science and modeling science, as described in the recent CONDOR report (*Operations Research*, 36, 619–637, 1988) are often important when undertaking new modeling in services. We will all benefit from reading well written papers that document these concerns. The potential for OR in services is

enormous and I eagerly await your important contributions.

SIMULATION

Bruce Schmeiser, Area Editor

The SIMULATION area focuses on digital-computer modeling and analysis of stochastic systems to estimate performance measures. Both dynamic-system and Monte Carlo simulation of models having no time component are considered. Simulation gaming, simulation trainers, and deterministic differential equation simulations lie outside the area.

Issues of interest include, but are not limited to, uniform (0, 1) random number generation, selection of input models, random variate generation, language and environment design, data structures, verification, validation, initial-transient bias amelioration, standard error estimation, confidence and prediction interval procedures, variance reduction, optimization over discrete feasible regions, and optimization over continuous feasible regions, including gradient estimation. Papers using simulation to evaluate and compare nonsimulation methodology will be processed by other areas or jointly with the SIMULATION Area.

Applications, survey, methodology, and basic theory papers are welcome. Application papers should illustrate quality simulation practice. How and why each aspect of the simulation study was performed is of primary interest. Survey papers should give structure to the topic discussed and include a complete bibliography. Papers presenting a new method should clearly state the method (usually in algorithmic form) and the context in which it is appropriate, including its limitations.

Comparisons, either empirical or theoretical, should be presented to demonstrate the strengths and weaknesses of the new method with respect to existing methods. Papers presenting new theory should clearly state the relationship to simulation practice, methods, and existing theory.

When empirical evaluations are presented, enough information should be given so that the reader could replicate the experiment(s). This information includes the computer, language, compiler, and random number generators used. The experimental design should be stated, including the number of replications and whether and how the replications are correlated. Some measure of sampling error should be given. The authors may be asked to provide computer code and output for the refereeing process.

STOCHASTIC PROCESSES AND THEIR APPLICATIONS

Shaler Stidham, Jr., Area Editor

This area is looking for papers that examine the effects of stochastic variation. Historically, the majority of our submissions have been on traditional subjects within operations research—queueing, reliability, and Markov decision processes. In addition to submissions on these subjects, we encourage papers that emphasize modeling of probabilistic phenomena in nontraditional subject areas.

The typical accepted paper contains a specific model of an interesting application, or a generic model that has potential practical value or makes a meaningful theoretical contribution. In this context, we look for substantial quantitative or qualitative results and for new methods of analysis.

Typical applications addressed by papers in our area are in telecommunications (both voice and data transmission), computer systems, manufacturing, traffic flow and transportation, and maintenance and reliability, but we are always on the lookout for novel applications.

In the past few years, a number of new journals devoted to stochastic processes have begun publication. For this reason, and because *Operations Research* has a diverse readership, we are not enthusiastic about papers that apply standard techniques to analyze a minor variant of a familiar stochastic model, with a limited range of application. We encourage papers that take explicit account of tradeoffs between different performance measures, that emphasize the role of the model as an aid to decision making, that discuss implementation and address issues of accurate and efficient numerical computation, and that provide bounds for performance when the assumptions of the model are not satisfied completely.

The coverage of this area overlaps with other areas. As a guide in choosing the area to which to submit a paper, author(s) should take into consideration the general applicability of the model(s) studied and the techniques employed. For example, a paper that develops a stochastic network model may have been motivated by a problem involving a computer system, but the resulting model and methods of analysis might also be applicable to flexible manufacturing. Such a paper would probably be more appropriate for our area than for Computing or, for that matter, Manufacturing, Production, and Scheduling.