**Dixième Symposium
international de
programmation mathématique**

Montréal, du 27 au 31 août, 1979

**Tenth International
Symposium on
Mathematical Programming**

Montreal, August 27-31, 1979

Programme
Program

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Un mot de bienvenue

Le Comité local d'organisation, au nom de la Société de programmation mathématique, est heureux de vous inviter à participer au Dixième Symposium international de programmation mathématique qui aura lieu sur le campus de l'Université McGill à Montréal du 27 au 31 août 1979. Le symposium est organisé conjointement par l'Université de Montréal, l'Université McGill, l'Ecole des Hautes Etudes Commerciales de Montréal, l'Ecole Polytechnique de Montréal et l'Université Concordia.

Le Dixième Symposium est tenu sous les auspices de la Société de programmation mathématique, de la Fédération internationale des sociétés de recherche opérationnelle (IFORS), et de la Société canadienne de recherche opérationnelle.

Les premiers symposiums remontent au début des années cinquante. La Société de programmation mathématique, une société internationale consacrée au développement des applications des méthodes de calcul et de la théorie en programmation mathématique, est devenue le principal instigateur des symposiums. Le huitième symposium a eu lieu à Stanford, en Californie, le neuvième, à l'Académie des sciences de Hongrie, et le nombre de participants a suivi le développement de la programmation mathématique.

Nous nous attendons à une participation importante au Dixième Symposium, le premier à être tenu au Canada; les délégués viendront d'universités, de centres de recherche et d'industries répartis dans le monde entier. Le programme comprendra des sessions plénières, des sessions parallèles regroupant des communications invitées ou proposées, trois mini-cours sur des sujets récents d'importance, et une réunion des membres de la Société de programmation mathématique, où le prix Fulkerson sera attribué pour la première fois.

Le Comité local d'organisation vous invite à participer au Dixième Symposium, où vous pourrez non seulement prendre part au programme scientifique, mais aussi découvrir les multiples aspects de la vie montréalaise en été.

Introduction and Welcome

On behalf of the Mathematical Programming Society, the Local Organizing Committee takes pleasure in inviting you to attend the Tenth International Symposium on Mathematical Programming to be held in Montreal, August 27-31, 1979, on the campus of McGill University.

It will be co-hosted by McGill University, Université de Montréal, Ecole Polytechnique de Montréal, Ecole des Hautes Etudes Commerciales de Montréal and Concordia University.

The Tenth Symposium is sponsored by the Mathematical Programming Society, the International Federation of Operations Research Societies and the Canadian Operational Research Society.

The Symposia began in the fifties. The Mathematical Programming Society, which was established as an international organization dedicated to the development of the applications, computational methods and theory of mathematical programming, has become their principal sponsor. The Eighth Symposium took place at Stanford, California in 1973 and the Ninth at the Hungarian Academy of Sciences in 1976 and attendance has grown in parallel with the field itself.

We anticipate a large attendance at the Montreal meeting, the first to be held in Canada, with many delegates coming from universities, research institutions and industries around the world. The format of the program of the meeting will include plenary presentations, parallel sessions including invited and contributed papers, mini courses on three new fields of growing importance, and a general meeting of the Mathematical Programming Society members at which the Fulkerson prize will be awarded.

The Local Organizing Committee invites your participation at the Symposium and is working hard to ensure that you will benefit not only from the conference sessions, but that you will also have time to enjoy the city and share in "la joie de vivre" that makes Montreal an attractive venue.

Patronage du Symposium

Les organisateurs tiennent à remercier pour leur soutien moral ou financier les organismes suivants:

La Société de programmation mathématique

La Fédération internationale des sociétés de recherche opérationnelle

La Société Canadienne de recherche opérationnelle

La Direction générale de l'enseignement supérieur, Ministère de l'éducation, Gouvernement du Québec

Le Conseil de recherches en sciences naturelles et en génie Canada

L'Université McGill

L'Université de Montréal

L'Ecole des Hautes Etudes Commerciales de Montréal

L'Ecole Polytechnique de Montréal

L'Université Concordia

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Symposium Sponsors

The organizers wish to thank the following organizations for their sponsorship or financial support:

The Mathematical Programming Society

The International Federation of Operations Research Societies

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La Direction générale de l'enseignement supérieur, Ministère de l'éducation, Gouvernement du Québec

National Sciences and Engineering Council of Canada

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L'Université de Montréal

L'Ecole des Hautes Etudes Commerciales de Montréal

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Informations générales

Lieu

Les activités scientifiques auront lieu dans les pavillons Stephen Leacock, Arts at Samuel Bronfman du campus principal de l'université McGill, situé dans le centre ville de Montréal. Pour y accéder, on emprunte l'entrée principale au coin de l'avenue McGill et de la rue Sherbrooke.

Accueil

Le Centre d'accueil et d'inscription sera situé dans la salle 109 du pavillon Stephen Leacock avec les heures d'ouverture suivantes:

Dimanche 26 août 1979 — de 14h00 à 19h00
du lundi 27 août au vendredi 31 août — de 8h00 à 18h00

Exposition de livres

Les participants sont conviés à visiter une exposition de livres qui aura lieu dans Leacock 111.

Transport

Si vous arrivez par l'aéroport international de Mirabel, ou si vous devez vous y rendre, nous vous conseillons d'utiliser l'autobus de la CTCUM vers ou à partir de son terminus au centre-ville de Montréal (803 rue Lagauchetière). Les départs dans les deux directions s'effectuent toutes les trente minutes. Le coût est $7.00 can. par personne comparativement à $32.00 can. pour le même trajet en taxi. Le terminus des autobus au centre-ville est à une courte distance en taxi des résidences de McGill et des hôtels.

Si vous arrivez à l'aéroport international de Dorval, ou si vous devez vous y rendre, un autobus (compagnie Murray Hill) effectue le trajet entre l'aéroport et les hôtels du centre-ville (dont le Sheraton Mont-Royal) pour $3.75 can. par personne. Les départs sont fréquents, toutes les 20 à 30 minutes, et le trajet dure de 30 à 45 minutes selon les conditions du traffic. Un taxi coûte approximativement $13.50 can. pour le même trajet.

General Information

Place

All scientific activities will take place in the Stephen Leacock, Arts and Samuel Bronfman Buildings at McGill University located in downtown Montreal. The best way to enter the campus is through the main gates at the corner of McGill College Avenue and Sherbrooke Street.

Symposium Headquarters

The Registration and Welcome Centre will be located in room 109 of the Stephen Leacock Building. It will be open according to the following schedule:

Sunday, August 26, 1979 — 14h00 — 19h00
Monday, August 27 to Friday, August 31. 8h00 — 18h00

Book Displays

Participants are invited to browse through a book exhibit in Leacock 111.

Transportation

If you arrive at or leave from Mirabel International Airport, please take the airport bus (CTCUM) to or from its terminal at 803 Lagauchetière Street in downtown Montreal (which is only a short taxi ride from the downtown hotels and McGill residences). Airport bus fare for this trip is $7.00 Can. as compared to approximately $32 Can. for a taxi directly to the airport. Buses leave the terminal and the airport from 2:00 p.m. until 11:30 p.m. at 30 minute intervals. The duration of the trip is approximately one hour.

If, on the other hand, your flight arrives at or leaves from Dorval International Airport, you can take an airport bus (Murray Hill) to or from the downtown hotels (including the Sheraton Mount-Royal) at a cost of $3.75 Can. Buses leave from the Sheraton every 20-30 minutes and the travelling time is approximately 30-45 minutes depending on Montreal traffic. Limousine or taxi service is also available for approximately $13.50 Can.

Réception et Banquet

Les participants au Symposium et leurs conjoints sont invités à assister à une réception le lundi 27 août 1979 à 18h00 au Hall d'honneur de l'Université de Montréal. Des autobus transporteront les participants. Ils quitteront le pavillon Leacock à 17h45. Vers 20h00, après la réception, ils retourneront vers les résidences de McGill et le Sheraton Mont-Royal.

Le jeudi 30 août à 19h00 nous proposons aux participants et à leurs invités un banquet au Gobelet, un restaurant bien connu de La Ronde, le parc d'amusement de l'exposition universelle de 1967. Le banquet sera composé de mets traditionnels québécois. Le coût du billet est de $20.00 can. par personne. Des autobus quitteront le Sheraton Mont-Royal et les résidences de McGill à 18h45. Des autobus seront également disponibles pour assurer le retour des participants. Ils quitteront La Ronde après le banquet vers 22h00 pour les résidences de McGill et le Sheraton Mont-Royal. Les participants qui désirent prolonger leur séjour à la Ronde peuvent revenir facilement à leur lieu de résidence en prenant un taxi ou en empruntant l'autobus no 169 à la sortie du parc La Ronde vers la station de métro Papineau pour ensuite prendre le métro jusqu'à la station Peel où il y a un accès direct au Sheraton Mont-Royal. Les billets pour le banquet sont mis en vente jusqu'au **mardi 28 août à midi**. Le nombre de billets est limité.

Social Program

All registrants and their spouses are cordially invited to attend a welcoming reception on Monday, August 27th, 1979 at 6:00 p.m. to be held at the Hall d'honneur in the University of Montreal's main building. Transportation will be provided to and from the reception; buses will leave at 5:45 p.m. from the McTavish street entrance of the Leacock Building and will return to the hotels and residences at approximately 8:00 p.m.

A banquet for registrants and guests will take place on Thursday, August 30th, 1979 at 7:15 p.m. and will be held at Le Gobelet. Le Gobelet, a well known restaurant that specializes in traditional Quebec food, is located at La Ronde, the renowed Montreal amusement park on the site of Man and His World (formerly Expo '67).

Transportation will be provided to and from the banquet. Buses will depart for the site at 6:45 p.m. from the Sheraton Mount-Royal Hotel and from Co-Educational Residences and will return at approximately 10:00 p.m. to the hotels and residences.

However, those who wish to explore the site after the banquet are encouraged to do so and may return by taxi or by taking the No. 169 bus which is available at the entrance to La Ronde. This bus will transport you to the Papineau metro station where you will take the metro to Peel (Angrignon line). Peel provides direct access to the Sheraton Mount-Royal Hotel.

Tickets to this event are limited and may be purchased until Tuesday, **August 28th at 12:00 noon**, at a cost of $20.00 Can per person.

Plan

1	Résidences mixtes
2	Pavillon Stephen Leacock
3	Pavillon Arts
4	Pavillon Samuel Bronfman
5	L'Hôtel Sheraton Mt-Royal

Guide to Facilities

1	McGill Co-Ed Residences
2	Stephen Leacock Building
3	Arts Building
4	Samuel Bronfman Building
5	Sheraton Mt. Royal Hotel
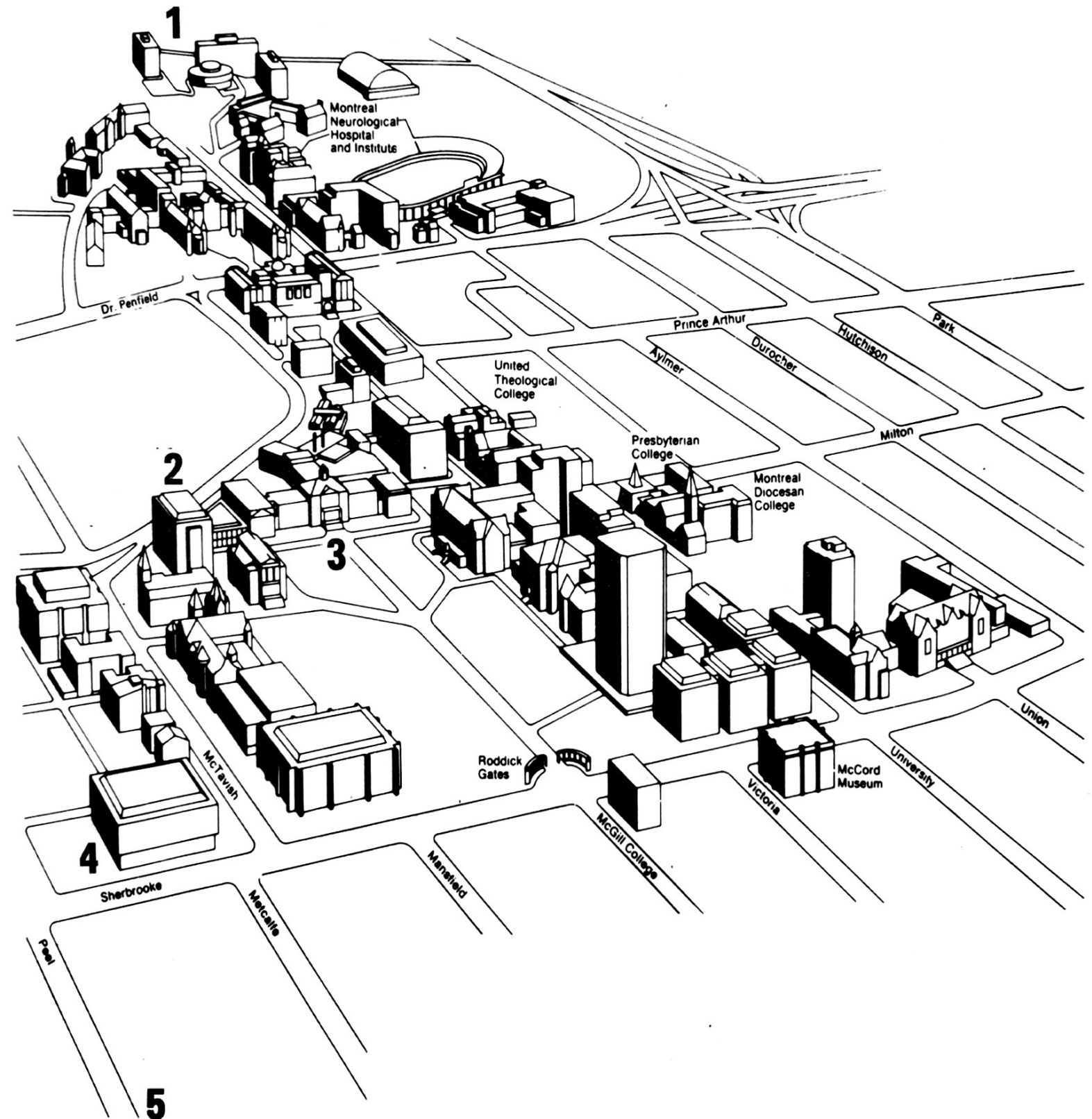
Horaire du Symposium   Symposium Schedule

	Dimanche 26 août / Sunday Aug. 26	Lundi 27 août / Monday Aug. 27	Mardi 28 août / Tuesday Aug. 28	Mercredi 29 août / Wednesday Aug. 29	Jeudi 30 août / Thursday Aug. 30	Vendredi 31 août / Friday Aug. 31
9h00 – 9h45		Ouverture officielle / Official Opening 9h15 – 9h45	Session plénière / Plenary Session	Session plénière / Plenary Session	Session plénière / Plenary Session	Session plénière / Plenary Session
9h45 – 10h00		Pause-café / Coffee	Pause-café / Coffee	Pause-café / Coffee	Pause-café / Coffee	Pause-café / Coffee
10h00 – 12h30		Sessions parallèles / Parallel Sessions	Sessions parallèles / Parallel Sessions	Sessions parallèles / Parallel Sessions	Sessions parallèles / Parallel Sessions	Sessions parallèles / Parallel Sessions
12h30 – 14h00		Déjeuner / Lunch	Déjeuner / Lunch	Déjeuner / Lunch	Déjeuner / Lunch	Déjeuner / Lunch
14h00 – 14h45	14h00 – 19h00 Inscription / Conference Registration	Session plénière / Plenary Session	Session plénière / Plenary Session	Session plénière / Plenary Session	Sessions en parellèle / Parallel Sessions 14h00 – 16h30	Session plénière / Plenary Session
14h45 – 15h00		Pause-café / Coffee	Pause-café / Coffee	Pause-café / Coffee		Pause-café / Coffee
15h00 – 17h30		Sessions parallèle s / Parallel Sessions	Sessions parallèles / Parallel Sessions 15h00 – 16h30	Sessions parallèles / Parallel Sessions	Mini-cours / Mini Courses 16h30 – 18h00	Sessions parallèles / Parallel Sesions 14h00 – 16h30
		Réception / Reception 18:00	Mini-cours / Mini Courses 16h30 – 18h30	Attribution du prix Fulkerson et assemblée générale des membres / Fulkerson Prize Award and general membership meeting 17h40	Banquet / Symposium Banquet 19h15	

Monday, August 27, morning

Session 1
Leacock 132

Plenary Session

9:15   Official Opening
L. Yaffe

9:25   Welcoming Remarks
P. Wolfe

Session 2
Leacock 110

Applications to Planning Problems

Chairman: P. Bod

10:00   **1**   A Linear Programming Model for Planning Electric Energy Supply in Canada
S.K. Choudhury
J.S. Rogers

10:30   **2**   Employment and Efficiency in the Italian Economy: A Linear Programming Model
U. Bertele
F. Brioschi
F. Quillico

11:00   **3**   An Application of Goal Programming Model for Manpower Planning of Saudi Arabia
M. Tahir
D. Saral

11:30   **4**   Physical Models and Methods in Mathematical Programming and Economics
B. Razumikhin

12:00   **5**   On the Stability of a Price Adjustment Process in Planning Economy
T.D. Berezneva
S.M. Movshovitch

Session 3
Leacock 230

Matching and Vertex Packing Problems

Chairman: M.W. Padberg

10:00   **6**   An Algorithm for the Vertex Packing Problem
A. Billionnet

10:30   **7**   A Polynomial Algorithm for Maximum Vertex Packings on Graphs Without Long Odd Cycles
W-L. Hsu
Y. Ikura
G.L. Nemhauser

11:00   **8**   An Algorithm for the Matching Problem
S. Alliney
M. Barnabei
L. Pezzoli

11:30   **9**   Effective Procedures for Finding Transversals, Perfect Matchings and Optimal Bottleneck Assignments
L. Slominski

Session 4
Leacock 219

Network Algorithms

Chairman: G.L. Thompson

10:00   **10**   *Network Optimization: New Methods and Applications. Part I
F. Glover
D. Klingman

10:30   **11**   *Network Optimization: New Methods and Applications. Part II
F. Glover
D. Klingman

11:00   **12**   *An Unsophisticated Implementation of the Simplex Method for Minimum Cost Network Flow Problems
M.D. Grigoriadis

11:30   **13**   An Efficient Steepest-edge Algorithm for Maximum Flow Problems
D. Goldfarb
M.D. Grigoriadis

Session 5
Moyse Hall, Arts Bldg.

Linear Programming: Theory

Chairman: W. Junginger

10:00   **15**   *Constructive Proof of a General Duality Theorem for Linear Inequalities and Equations
E.D. Nering
A.W. Tucker

10:30   **16**   *Linear Programming Duality and Minty's Lemma
R.G. Bland

11:00   **17**   Duality and Linear Programs with Generalized Objectives
U. Zimmermann

11:30   **18**   Necessary and Sufficient Conditions for Multi-Index Transportation Problems
W. Junginger

12:00   **19**   The Kairo Method and Post-Optimization
M.M. Gouda

Session 6
Leacock 226

Unconstrained Optimization (I)

Chairman: M.J.D. Powell

10:00   **20**   *Conjugate Gradients: Key to Lanczos Eigenvalue Procedures For Large, Symmetric Matrices
J. Cullum
R.A. Willoughby

10:30   **21**   *Trends in Sparsity Exploiting Quasi-Newton Optimization Methods
Ph.L. Toint

11:00   **22**   Computational Experience with Variable Metric Methods for Sparse Hessians
D.F. Shanno

11:30   **23**   On Sparse Matrix Updates for Unconstrained Optimization
T. Steihaug

12:00   **24**   Collinear Scaling Algorithms for Unconstrained Optimization
D.C. Sorensen

Session 7
Leacock 14

Convex Programming (I)

Chairman: R.R. Meyer

10:00   **25**   *Applications of Optimality Conditions in Convex Programming
A. Ben-Israel
A. Ben-Tal
S. Zlobec

10:30   **26**   A Duality Theory for a Class of Problems with Essentially Unconstrained Duals
A. Ben-Tal
Y. Barzilai
A. Charnes

11:00   **27**   L-Strongly Convex Functionals and Their Applications
A.V. Levitin

11:30   **28**   Optimality and Regularity Conditions for the Convex Programming Problem in Banach Spaces
J. Borwein
H. Wolkowicz

12:00   **29**   *Duality Theorems for Modified Lagrangians in Convex Programming
E.G. Gol'shtein
N.V. Tret'yakov

Session 8
Leacock 132

Mathematical Programming: Misconceptions, Curses, Scope and Effectiveness

Chairman: H. Muller-Merbach

10:00   **30**   *Popular Misconceptions Regarding the Application of Mathematical Programming to Planning
A.M. Geoffrion

10:30   **31**   *Optimization - The Curse of Mathematical Programming
M. Jeffreys

11:00   **32**   *The Current Scope and Effectiveness of Linear Programming in a Large Firm
A. Orden

11:30   **33**   Mathematics Through Mathematical Programming
A. Gewirtz

Session 9
Leacock 114

Multi-stage Stochastic Programming

Chairman: P. Kall

10:00   **34**   *Representation of Multi-stage Stochastic Linear Programs with Finite Distribution
R.C. Grinold

10:30   **35**   Solving Multistage Stochastic Quadratic Programs
F. Louveaux

11:00   **37**   Estimation of the Transition Matrix of a Doubly Stochastic Markov Chain
M. Raghavachari
G.L. Yang

11:30   **38**   Duality and Information in Stochastic Linear Programming Exemplified by a Dynamic Inventory Control Model
W.K.K. Haneveld

Session 10
Leacock 12

Infinite Dimensional Mathematical Programming

Chairman: B. Mond

10:00   **39**   *Optimality Conditions for Programming Problems Involving Multivalued Mappings
W. Oettli

10:30   **40**   *Infinite Dimensional Mathematical Programming Problems Arising in Communication and Control
S.K. Mitter

11:00 **41** Post-optimality Analysis for Continuous Programming
R.N. Buie
J. Abrham

11:30 **42** Separably Infinite Programming
A. Charnes
P.R. Gribik
K.O. Kortanek

12:00 **43** *A General Theory of Second Order Conditions
A.D. Ioffe

Session 11
Leacock 116

Game Theory (I)

Chairman: L.S. Shapley

10:00 **44** *Pay-off Mollifiers and the Harsenyi-Selten Valuation Function
A. Charnes
J. Rousseau
L. Seiford

10:30 **45** *Games with Supermodular Characteristic Functions
D.M. Topkis

11:00 **46** An Information Theory of Game Systems
S. Kano
Y. Kai

11:30 **47** A Characterization of Vector Measure Games in pNA
Y. Tauman

12:00 **48** Generalized Shapley Values by Simplicial Sampling
B. Von Hohenbalken
T. Levesque

Monday, August 27, afternoon

Session 12
Leacock 132

Plenary Session

Chairman: M. Held

14:00 **49** *The Probabilistic Analysis of Combinatorial Optimization Algorithms
R.M. Karp

Session 13
Leacock 14

Nonlinear Network Optimization

Chairman: R.S. Dembo

15:00 **50** Direct Solutions to Some Constrained Transportation Problems
P. Scobey
D.G. Kabe

15:30 **51** A Direct Method for the Quadratic Capacitated Transportation Problem with Separable Costs
J-S. Pang

16:00 **52** Minimum-Concave-Cost Network Flows
R.E. Erickson

16:30 **53** Solving Network Concave Optimization Problems
M. Trojanowski

17:00 **54** Distributions of Vertex and Path Attributes for a Few Parametrized Polytope Classes
P.C. Kettler

Session 14
Leacock 12

Unconstrained Optimization (II)

Chairman: A. Ben-Israel

15:00 **55** *Quasi-Newton Methods for Minimax
S-P. Han

15:30 **56** Updating Quasi-Newton Matrices with Limited Storage
J. Nocedal

16:00 **57** An Acceptable-Point Algorithm for Function Minimization
G.E. Johnson
M.A. Townsend

16:30 **58** Computing Optimal Locally Constrained Steps
D.M. Gay

17:00 **59** The Differential Geometry of the Twice Continuously Differentiable Unconstrained Optimization Surface and its Application to the Newton/Greenstadt Method
R. Frank

Session 15
Leacock 110

Applications in Resource Allocation

Chairman: J.L. Balintfy

15:00 **60** Introducing a Non-linear Optimizer into a Financial Planning Language
A. Roy
L. Lasdon

15:30 **61** Computational Analysis of Equivalent Formulations for Linear Product-Mix Models and Mixed-Integer Production-Investment Models
G.F. Knolmayer

16:00 **62** A Goal Programming Sensitivity Analysis Approach to the Product Mix Problem
M.H. Elwany

16:30 **63** Solving Certain New Problems of Resource Allocation by Mathematical Programming
R. Slowinski
J. Weglarz

17:00 **64** A Generalized Application of Method "Optimization with Minimal Information"/"OMI"/to Some Type of Allocation Problems
Z.M. Farkas

Session 16
Leacock 114

Multiobjective Optimization: (I)

Chairman: P. Huard

15:00 **65** *Strong Vector Minimization and Duality
B.D. Craven

15:30 **66** Saddle-Point for Vector Valued Functions
B. Lemaire

16:00 **67** Holistic Preference Evaluation in Multiple Criteria Optimization
J.K. Ho

16:30 **68** Multiple Objective Mathematical Programming with Respect to Multiple Decision-Making
R.E. Wendell

Session 17
Leacock 132

Constrained Optimization (I)

Chairman: A. Fiacco

15:00 **69** *An Exact L1 Penalty Function Method for Nonlinear Equations and Nonlinear Programming
R. Fletcher

15:30 **70** *A Technique for Forcing Convergence in Variable Metric Methods For Constrained Optimization
R.M. Chamberlain
H.C. Pedersen
M.J.D. Powell

16:00 **71** *On the Convergence Properties of Variable Metric Recursive Quadratic Programming Methods
L.C.W. Dixon

16:30 **72** *The Computation of Lagrange-Multiplier Estimates for Constrained Minimization
P.E. Gill
W. Murray

17:00 **73** A Superlinearly Convergent Algorithm for Constrained Optimization Problems
D.Q. Mayne
E. Polak

Session 18
Leacock 26

Nonsmooth Optimization (I)

Chairman: R.T. Rockafellar

15:00 **74** *Nonsmooth Optimization
F.H. Clarke

15:30 **75** *An Approach to Newton Method in Nondifferentiable Optimization
E.A. Nurminski

16:00 **76** *Convergence of a Modification of Lemarechal's Algorithm for Nonsmooth Optimization
R. Mifflin

16:30 **77** On the Surprising Effectiveness of Subgradient Optimization
J.L. Goffin

17:00 **78** Multipliers and Duality in Nonconvex Nondifferentiable Programming
J.P. Penot

Session 19
Leacock 116

Stochastic Programming Applications

Chairman: B. Bereanu

15:00   **79**   *Stochastic Linear Programming Models of Short-Term Financial Planning Under Uncertainty
W.T. Ziemba

15:30   **80**   Stochastic Programming in Portfolio Selection
R.J. Peters
B.V.H. Van de Kieft

16:00   **81**   Duality in Stochastic Programming Applied to the Operation of a Reservoir
H.F. Karreman

16:30   **82**   Parametric Estimation of Urban Residential Mobility Process by Linear Programming Procedure
P. Krishnan
G. Rowe

17:00   **83**   *Nested Optimization in DOA Estimation for Nonlinear Dynamical Systems: Spacecraft Large Angle Manoeuvres
M.A.H. Dempster

Session 20
Leacock 219

Complexity of Linear Programs

Chairman: G. Mitra

15:00   **84**   *Computational Complexity of Parametric Linear Programming
K.G. Murty

15:30   **85**   *The Steepest Edge Simplex Method: Actual Versus Worst Case Behaviour
D. Goldfarb

16:00   **86**   *A Comparison of Real World Linear Programs and Their Randomly Generated Analogs
R.H.F. Jackson
R.P. O'Neill

16:30   **87**   Implementation Experience-Active Set Selection Using a Variable Metric Generalization of the Simplex Algorithm
L.D. Pyle

17:00   **88**   Experiments and Experience in Designing Optimal Inversion Routines
D. Ohse

Session 21
Leacock 226

Applications to Air Transportation

Chairman: M. Grigoriadis

15:00   **89**   *Spider Graph Models for Network Design and Fleet Planning in the Air Cargo Industry
R.E. Marsten
M.R. Muller

15:30   **90**   Fleet Scheduling
O. Holst
P. Allan-Andersen

16:00   **91**   Interactive Models for Aircraft Load Planning
O. Holst
O. Kessel
O. Larsen
G. Mikkelsen

16:30   **92**   The Optimal Sequencing of Aircraft Landings at a Two-Runway Airport
H.N. Psaraftis

17:00   **93**   Efficient Combinations of Optimization Algorithms for Flight Mechanics Problems
J. Shinar
D. Blank

Session 22
Leacock 230

Integer Programming: Theory (I)

Chairman: M. Iri

15:00   **94**   *On the Integer Transition Property
A.J. Hoffman

15:30   **95**   *Characterisations and Properties of Totally Unimodular and Balanced Matrices
D. de Werra

16:00   **96**   Totally Unimodular Programs with Multiparametric Right-Hand Sides
C.L. Monma
J.E. Somers
I. Adler

16:30   **97**   Finite Checkability for Integer Rounding Properties in Combinatorial Programming Problems
S. Baum
L.E. Trotter Jr.

17:00   **98**   Frequency Functions in Duality
L. Papayanopoulos

Tuesday, August 28, morning

Session 23
Leacock 132

Plenary Session

Chairman: J.B. Rosen

9:00   **99** *Theorems of the Alternative in Mathematical Programming
O.L. Mangasarian

Session 24
(Invited Session: Sponsored by the Committee on Algorithms - Part I)
Leacock 132

Progress in Evaluating Mathematical Programming Algorithms (I)

Chairman: J.M. Mulvey

10:00   **100** Can a General Purpose NLP Code Find Happiness in a GP World?
J.E. Fattlar
G.V. Reklaitis
K.M. Ragsdell

10:30   **101** A Methodology for Testing Mathematical Programming Software
P.D. Domich
K.L. Hoffman
R.H.F. Jackson
P.B. Saunders
D.R. Shier

11:00   **102** Testing Mathematical Programming Algorithms on Randomly Generated Polyhedra
J. Telgen

11:30   **103** Ranking Mathematical Programming Techniques Using Priority Theory
F.A. Lootsma

12:00   **104** Processing Time: An Accurate Measure of Code Performance?
K.L. Hoffman
R.H.F. Jackson

Session 25
Leacock 14

Assignment Problems

Chairman: S. Storoy

10:00   **105** *On the Solution of 3-Dimensional Assignment Problems
R.E. Burkard

10:30   **106** *A Recursive Method for Solving Assignment Problems
G. Thompson

11:00   **107** A Dual Algorithm for the Assignment Problem
A. Weintraub
F. Barahona

11:30   **108** Extremal Problems of Permutation Cycles
M. Hung
A. Waren
W. Rom

Session 26
Leacock 12

Fixed-Point Algorithms

Chairman: B.C. Eaves

10:00   **109** *Some Results on Fixed Point Algorithmic Theory
H. Tuy

10:30   **110** *On Solving Large Structured Fixed Point Problems
R. Saigal

11:00   **111** A Fixed Point Algorithm for Arbitrary Complexes
W. Forster

11:30   **113** Computational Efficiency of Fixed Point Algorithms
R.M. Anderson

Session 27
Leacock 230

Global Optimization (I)

Chairman: L.C.W. Dixon

10:00   **114** *Global Optimization Techniques: The State of the Art
G.P. Szego

10:30   **115** *Computing the Global Maximum of a Convex Function with Linear Constraints
J.B. Rosen

11:00   **116** *Techniques for Global Optimization
L. De Biase
A.H.G. Rinnooy Kan

11:30   **117** *A Statistical Approach to Solving Concave Minimization Problems With Linear Constraints
N.R. Patel
R.L. Smith

12:00   **118** Convergent Algorithm for Minimizing a Concave Function
H. Tuy
N. Van Thoai

Tuesday morning (continued)

Session 28
Leacock 114

Methods in Combinatorial Optimization

Chairman: R.G. Jeroslow

10:00   **119**   *Obtaining k Best Solutions for Combinatorial Optimization Problems
T. Ibaraki
H. Mine
N. Katoh

10:30   **120**   Synthetical Analysis of Enumerative Algorithm
Y. Sekiguchi

11:00   **121**   Probabilistic Integer Programming
C. Ritz

11:30   **122**   Admissible Transformations for Solving Combinatorial Optimization Problems with Generalized Objectives
U. Derigs

12:00   **123**   On Application of Analytical Methods to Combinatorial Problems
A. Berstein
P. Buzytsky
G. Freiman

Session 29
Leacock 110

Constrained Optimization (II)

Chairman: R. Fletcher

10:00   **124**   *Determining Whether a System of Nonlinear Inequality Constraints Has a Feasible Point
R. Schnabel

10:30   **125**   A Newton-like Method for General Nonlinear Programming Via Slack Variables
E. Spedicato

11:00   **126**   The Exponential Potentials Method
F.C. Incertis
A.M. Vazquez-Muniz

11:30   **127**   Elimination of Bounds in Optimization Problems by Transforming Variables
F.S. Sisser

12:00   **128**   *A Nonlinear Factorable Programming Language
G.P. McCormick

Session 30
Moyse Hall, Arts Bldg.

Structure and Sparsity in Linear Programming

Chairman: J.A. Tomlin

10:00   **129**   *A Reduced LU Algorithm for the Simplex Method
S. Powell

10:30   **130**   *Exploiting Structure and Sparsity in LP Computational Procedures: An Overview of Recent Advances and Established Methods
G. Mitra

11:00   **131**   Structure Analysis and Partial Reinversion of Large Bases in Linear and Nonlinear Programming
J. Bisschop
A. Meeraus

11:30   **132**   The Use of Sparsity by the Non-Uniqueness in Large-Scale LP Problems
I. Foltyn

12:00   **133**   Investigation of Algorithms Used in the Restructuring of Linear Programming Basis Matrices Prior to Inversion
K. Darby-Dowman
G. Mitra

Session 31
Leacock 226

Mixed Integer Programming

Chairman: K. Spielberg

10:00   **134**   *A Master Problem for Mixed Integer Programming
E.L. Johnson

10:30   **135**   Large-Scale Mixed Integer Programming: Benders-Type Heuristics
G. Cote
M.A. Laughton

11:00   **136**   Multi-Stage Benders' Decomposition Applied to Multi-Period, Multi-Commodity, Production, Distribution and Inventory System
K. Tone

11:30   **137**   Analysis of Composite Strategies for Relaxed MILP Problems A Case Study: Discriminant Functions Optimization
A.M. Vazquez-Muniz

12:00   **138**   A Composite Integer Linear Programming Algorithm
E. Toczylowski

Session 32
Leacock 116

Applications in Communications

Chairman: K.G. Murty

10:00 **139** Optimal Planning of Telecommunications Networks
A. Pigott

10:30 **140** Heuristic Algorithm for the Optimum Communication Spanning Tree Problem
P.M. Camerini
L. Fratta
F. Maffioli

11:00 **141** Mathematical Programming Models for Planning a Trans-Atlantic Communications Network
G.A. Kochman
C.J. McCallum

11:30 **142** Development of a Computerized Frequency Assignment System to Avoid Intermodulation Interferences
S. Morito
H.M. Salkin
D.E. Williams

12:00 **143** The Administration of Standard Length Telephone Cable Reels
T. Gontijo Rocha
R. De Araujo Almeida
A. De Oliveira Moreno
N.F. Maculan

Session 33
Leacock 219

Multicommodity Flows

Chairman: A. Land

10:00 **144** *Newton-like Methods for Nonlinear Multicommodity Network Flow Problems
D.P. Bertsekas

10:30 **145** *Large-Scale Nonlinear Network Optimization
R.S. Dembo

11:00 **146** Coupled Multi-Commodity Flows in Generalized Networks
A. Girard

11:30 **147** Lagrangean Relaxation and Decomposition for Optimum Multicommodity Network Synthesis with Security Constraints
M. Minoux
J.Y. Serrault

12:00 **148** A Bender's Decomposition Algorithm for the Combined Distribution and Assignment Problem
K. Jornsten

Session 34
Leacock 132

Plenary Session

Chairman: A.W. Tucker

14:00 **149** *Solving Dynamic Linear Programs
G.B. Dantzig

Session 35
(Invited Session: Sponsored by the Committee on Algorithms - Part II)
Leacock 132

Progress in Evaluating Mathematical Programming Algorithms (II)

Chairman: J.M. Mulvey

15:00 **150** On Some Experiments which Delimit the Utility of Nonlinear Programming Methods for Engineering Design
E. Sandgren
K.M. Ragsdell

15:30 **151** Performance Indicators for Evaluating Math Programming Software
P.B. Saunders
H.T. Crowder

16:00 **152** A Numerical Comparison of Optimization Programs Using Randomly Generated Test Problems
K. Schittkowski

Session 36
Leacock 116

Dynamic Programming: Applications

Chairman: B.L. Fox

15:00 **153** *Piecewise Dynamic Programs with Applications
K. Sawaki

15:30 **154** Teaching Planning Decisions in Mine Production by Dynamic Programming
J. Elbrond

16:00 **155** Forecast-Accelerated Algorithms for Markov Decision Processes
L. Contreras

Session 37
Leacock 12

Bounds for Combinatorial Problems

Chairman: L.A. Wolsey

15:00   **156** *Lower Bounds to the Set Covering Problem from Graph Covering Relaxations
N. Christofides
A. Hey

15:30   **158** Bounds on the Reliability Polynomial for Shellable Independence Systems
M. Ball
S. Provan

Session 38
Leacock 114

General

Chairman: J. Gauvin

15:00   **159** On Certain Properties of the System of Linear Extremal Equations
P. Butkovic

15:30   **160** Optimal Algorithms of Definitions of Pareto Optimal Set
Y.A. Kriukov

16:00   **161** Computation of Hyperbolic Arctangents and Hyperbolic Tangents
R.S. Mullins

Session 39
Leacock 226

Game Theory (II)

Chairman: D.M. Topkis

15:00   **162** *A Survey of Models for Equitable Distributions
W.F. Lucas

15:30   **163** Political Elections in Europe and Shareholders' Strategies in Order to Control a Company, Studied Using the Shapley Value of a Game
G. Gambarelli

16:00   **164** An Asymmetrical Min-max Theorem for Games Against Nature
H. Blum

Session 40
Leacock 110

Linear Systems of Inequalities

Chairman: R.G. Bland

15:00   **165** Redundancy in Systems of Linear Constraints
J. Telgen

15:30   **166** Improvements to a Vertex Generating Algorithm
M.E. Dyer
L.G. Proll

16:00   **167** Calculating the Frame of Homogeneous Equation Systems
B. Von Hohenbalken

Session 41
Leacock 219

Linear Complementarity

Chairman: H. Tuy

15:00   **168** *What we Know About Q-Matrices
R.W. Cottle

15:30   **169** *The Linear Complementarity Problem
R.D. Doverspike
C.E. Lemke

16:00   **170** *A Version of Lemke's Algorithm Using Only Elementary Principal Pivots
S.J. Byrne
R.W.H. Sargent

Session 42
Leacock 26

Subgradient and Duality in Integer Programming

Chairman: D. de Werra

15:00   **171** *Dual Approaches in Integer Programming
J. Krarup
S. Walukiewicz

15:30   **172** Subgradient Approach and Integer Programming
J-P. Dussault
J.A. Ferland

16:00   **173** Combining Subgradients for Lagrangean Relaxation
A.M. Hey

Session 43
Leacock 230

Approximation
Chairman: P.E. Gill

15:00 **174** Solving Equations Using Orthogonal Polynomials
P.C. Cooley

15:30 **175** A Nonlinear-Equation-Solver for Unconstrained
Optimization
H. Ohiwa

16:00 **176** Caracterisation Geometrique d'une Meilleure
Approximation a l'Aide d'un Couple de Fonctions
C. Carasso

Session 44
Leacock 44

Global Optimization (II)
Chairman: G.P. Szego

15:00 **177** An Algorithm for Linear Programs with an
Additional Reverse Convex Constraint
R.J. Hillestad
S.E. Jacobsen

15:30 **178** A Probabilistic Approach to the Solution of Global
Optimization Problems
B. Betro

16:00 **179** A Hybrid Algorithm to Find the Global Minimum
N. Baba

Session 45
Leacock 132

Mini Courses - Part I
Chairman: M.J. Todd

16:30 **180** 'Pivotal Exchange Methods: Theory, Computation
and Applications
H.W. Kuhn

Session 46
Bronfman 151

Mini Courses - Part 1
Chairman: L.J. Billera

16:30 **181** 'Lectures on Multiple Criteria Decision Making
S. Zionts

Session 47
Leacock 219

Mini Courses - Part 1
Chairman: H.P. Williams

16:30 **182** 'Theoretical Approaches to the Evaluation of
Heuristic Combinatorial Algorithms
D.S. Johnson
R.M. Karp

Wednesday, August 29, morning

Session 48
Leacock 132

Plenary Session

Chairman: J. Abadie

9:00   **183** *A Survey of NLP Software and Applications
L. Lasdon

Session 49
(Invited Session: Sponsored by the Committee on Algorithms)
Leacock 132

Testing and Validation of Mathematical Programming Systems

Chairmen: R.H.F. Jackson, R.P. O'Neill

10:00   **184** MPSIII Quality Assurance
J. Creegan

10:30   **185** Goals and Testing for Burroughs MP Software
D.M. Carstens

11:00   **186** Testing and Validation of IBM's Mathematical Programming Software
M. Benichou
J.M. Gauthier
G. Ribiere

11:30   **187** Validation of OMNI and PDS
C.A. Haverly

12:00   **188** Testing Procedures in Sperry Univac for its 1100 Series Mathematical Programming Product, FMPS
E.H. McCall

Session 50
Leacock 116

Statistical Estimation

Chairman: W.T. Ziemba

10:00   **189** On Some Optimization Problems Arising in Experimental Design
F. Archetti

10:30   **190** Development and Testing of a Completely User-Oriented Fitting Procedure Based on a Non-Linear Least Squares Method
A. Colosimo
A. Polzonetti

11:00   **191** Development of SALS System - Statistical Analysis with Least Squares Fitting
T. Nakagawa
Y. Oyanagi
H. Ohiwa

11:30   **192** Fitting Multifactor Data: A Case Study
T.M. Simundich

12:00   **193** Recursive Estimation of Time Varying Parameters in Regression Models
J.P. Indjehagopian

Session 51
Leacock 110

Applications to National and Regional Planning

Chairman: H. Konno

10:00   **194** *Problems in Regional and Global Modelling: Would Math Programmers be Interested?
A.N. Elshafei

10:30   **195** Multiobjective Multilevel Programming Models for Regional Planning
P. Nijkamp
P. Rietveld

11:00   **196** Applications of Mathematical Programming to Economic Policy Making: Some Empirical Results
C-L. Sandblom

11:30   **197** *OMER: A Technoeconomic Energy Model for Israel
M. Avriel

12:00   **198** Rim Analysis - Statistical Techniques Applied to the Evaluation of the National Energy System by Multiple Criteria
Y. Draper
S.J. Finch
A.S. Kydes

Session 52
Leacock 219

Post Optimization in Non Linear Programming

Chairman: U. Passy

10:00   **199** *Extensions of the Gauvin-Tolle Optimal Value Differential Stability Bounds to General Parameter-Dependent Mathematical Programs
A.V. Fiacco
W.P. Hutzler

10:30   **200** Differential Properties of the Marginal Function in Mathematical Programming
J. Gauvin
F. Dubeau

11:00   **201** On the Parametric Variation of Nonlinear Programmes and the Convergence of Nonlinear Programming Algorithms
R.W.H. Sargent

11:30   **202** Perturbation Theory for Functions Over Convex Sets
J. Maguregui

12:00 **203** Quantitative Analysis of the Stability Sets in Convex Programming with Parameters in the Objective Function
M.S.A. Osman

Session 53
Leacock 14

Shortest Path Algorithms

Chairman: E. Balas

10:00 **204** An Algorithm to Find All the Shortest Path Trees of a Network
G. Gallo
S. Pallottino

10:30 **205** Adaptation of the Algorithm of d'Esopo-Pape for the Determination of All Shortest Paths in a Network: Improvements and Simplifications
S. Pallottino

11:00 **206** *A Dual-Simplex Based Algorithm for Finding All the Shortest Path Trees on a Network
M. Florian
S. Nguyen
S. Pallottino

11:30 **207** *A Computational Study of Floyd's Algorithm
D.R. Shier

Session 54
Leacock 226

Complexity in Combinatorial Optimization

Chairman: L.E. Trotter

10:00 **208** *Oracle Algorithms for Combinatorial Optimization Problems and Related Topics
B. Korte

10:30 **209** *Scheduling Two-Machine Flow Shops and Open Shops
E.L. Lawler
J.K. Lenstra
A.H.G. Rinnooy Kan

11:00 **210** Approximation Algorithms for Clustering Problems
P. Brucker

11:30 **211** On Computational Complexity of Unitary Transforms
E.A. Trachtenberg

12:00 **212** Complexity of Approximation Algorithms for Combinatorial Optimization Problems
E.V. Levner
G.V. Gens

Session 55
Moyse Hall, Arts Bldg.

Large-Scale Linear Programming

Chairman: A. Orden

10:00 **213** *Linkage of Optimization Models
M. Kallio
W. Orchard-Hays
A. Propoi

10:30 **214** Advanced Implementation of the Dantzig-Wolfe Decomposition Algorithm
B. Culot
E. Loute
J.K. Ho

11:00 **215** A Decomposition Procedure for a Production Planning Model
O.S. Benli

11:30 **216** Two-Level Linear Optimization Via Aggregation
D.G. Liesegang

12:00 **217** Solving Large-Scale Structured Linear Programs by Aggregation and Disaggregation
S-J. Lee

Session 56
Leacock 12

Constrained Optimization (III)

Chairman: K. Tone

10:00 **218** A Projected Lagrangian Method for Nonlinear Programming Using the Algorithmic Tools of Linear Programming Codes
L.F. Escudero

10:30 **219** A Global and Superlinear Method to Solve the Nonlinear Programming Problem
T.F. Coleman
A.R. Conn

11:00 **220** Constrained Quasi-Newton Method with Differentiable Objective Function
H. Yamashita

11:30 **221** An Efficient Method of Feasible Directions
G.G.L. Meyer

12:00 **222** Linearly Constrained Pseudo-Newton Method
J.H. May

Session 57
Leacock 230

Engineering Design Problems (I)

Chairman: F. Giannessi

10:00   **223** *On the Nature of Optimization Problems in Engineering Design
E. Polak

10:30   **224** On the Feedback Between Mathematical Programming and the Engineering Design Process
H.J. Baier

11:00   **225** A Non-Linear Programming Algorithm for Structural Optimization Problems
J. Herskovits
N. Zouain

11:30   **226** An Algorithm for Optimum Structural Design Using Duality
K. Svanberg

12:00   **227** Design of Optimal Decoupled Low Sensitivity Controllers for Industrial Multivariable Systems
N.N. Sorial

Wednesday, August 29, afternoon

Session 58
Leacock 132

Plenary Session

Chairman: G.B. Dantzig

14:00   **228** *The Significance of Numerical Analysis and Computer Science in Mathematical Programming
W. Murray

Session 59
Leacock 226

Polyhedra

Chairman: R.J. Duffin

15:00   **229** *Inscribing and Circumscribing Convex Polyhedra
B.C. Eaves
R.M. Freund

15:30   **230** *Decomposition of Complexes and Diameters of Polyhedra
L.J. Billera
J.S. Provan

16:00   **231** Faces of Polar Polyhedra and Extension of Facets
J. Araoz
J. Edmonds
V.J. Griffin

16:30   **232** Faces of Polar Polyhedra
V.J. Griffin

17:00   **233** Simplicial Partitionings of Internally Represented Polytopes
B. Von Hohenbalken

Session 60
Leacock 26

Convex Programming (II)

Chairman: S.M. Robinson

15:00   **234** A Constrained Optimization Algorithm for Solving Certain Convex Systems of Equations
D. Solow

15:30   **235** Sphero-Convex Sets
J-P. Vial

16:00   **236** Methods for the Decomposition of Variational Inequalities Via the Proximal Point Algorithm
D. Gabay

16:30   **237** Applications of Sublinear Operators to Subdifferential Calculus and to Convex Mathematical Programming
M. Thera

17:00   **238** Variable Aggregation in Convex Programming
G. Huberman

Session 61
Leacock 14

Engineering Design Problems (II)

Chairman: F.A. Lootsma

15:00 **239** Optimal Design and Operation of Central Energy Systems by Bender's Decomposition
P. Nanda
D.E. Cullen
W. Price

15:30 **240** The Optimization of the Energy Consumptions in the Heating of Buildings by Nonlinear Programming
F. Archetti
C. Vercellis

16:00 **241** *Optimum Sizing of Heat Exchangers in a Network
J.H. Bryant
M.M. Gutterman

16:30 **242** The Application of Nonlinear Programming to the Control of Automobile Engines
A.I. Cohen
H.S. Rao
J.A. Tennant
K.L. Vanvoorhies

17:00 **243** Optimization of a Complex Chemical Process Using an Equation Oriented Model
P.V.L.N. Sarma
G.V. Reklaitis

Session 62
Leacock 12

Integer Programming: Computation

Chairman: G.L. Nemhauser

15:00 **244** *An Alternative Branch and Bound Strategy for Ordered Sets
J.J.H. Forrest

15:30 **245** *A Bounding Technique for Integer Linear Programming with Binary Variables
F.S. Hillier
N.E. Jacqmin

16:00 **246** On Computational Techniques for Parametric and Postoptimality Analysis in Integer Linear Programming
H.H. Hoc

16:30 **247** Implicit Enumeration Approach to Integer Linear Programs
R. de Fco
J. Larraneta

17:00 **248** Parametric Integer Linear Programming Using a Standard Package
L. Jenkins

Session 63
Leacock 110

Industrial Applications

Chairman: A. Prekopa

15:00 **249** Heuristic Methods for Balancing Assembly Lines: Some Preliminary Results
W.V. Gehrlein
J.H. Patterson
F.B. Talbot

15:30 **250** Container Stacking - An Application of Mathematical Programming
D.B. Taylor

16:00 **251** HSTRIM - A Program for Scheduling Cutting Stock Operations
M. Fieldhouse
F.W. Tromans

16:30 **252** Construction of Optimal Synthetic Weather Data by Convex Combination
G. Silverman
D. Low

17:00 **253** A Plant Location Problem for the Optimal Use of Byproducts in Slaughtering Industry
U. Bertele
F. Brioschi
P. Dalla Favera
S. Poggi

Session 64
Leacock 219

Unconstrained Optimization (III)

Chairman: E.M.L. Beale

15:00 **254** *Planar Variable Metric Methods (PVMM) for Unconstrained Saddlepoint Problems: The Quadratic Case
S.S. Oren

15:30 **255** *When to Stop Making Quasi-Newton Updates
P. Barrera
J.E. Dennis

16:00 **256** Design of Newton-like Methods for Solving Systems of Nonlinear Equations
J.C.P. Bus

16:30 **257** Why is the BFGS Method So Good?
L. Nazareth

17:00 **258** Numerical Comparison of Self Scaling Variable Metric Algorithms
G. Van der Hoek

Wednesday afternoon (continued)

Session 65
Leacock 132

Integer Programming Theory (II)

Chairman: B. Korte

15:00 **259** *Cutting Planes in Integer Programming: Are They Useful?
E. Balas

15:30 **260** *Disjunctive Programs and Sequences of Cutting-Planes
C.E. Blair III

16:00 **261** *Expanded Group Knapsack Networks and Integer Programming
B.L. Fox
E.V. Denardo

16:30 **262** Integer Programming Duality: Price Functions and Sensitivity Analysis
L.A. Wolsey

17:00 **263** On the Number of Feasible Solutions of an Integer Programming Problem
M.A. Frumkin

Session 66
Leacock 116

Optimal Control Theory

Chairman: S.K. Mitter

15:00 **264** *Optimization Under Complex Indeterminacies
B. Bereanu

15:30 **265** Controllability of Parabolic Systems
E. Sachs

16:00 **267** Time-Optimal Control Problem with Limitations for the Derivatives of Control
T. Gicev
V. Vel'ov

16:30 **268** Stability, Duality and Necessary Conditions for Optimality in Infinite-Dimensional Non-Linear Programming and Optimal Control
F. Lempio

Session 67
Leacock 230

Large Scale Nonlinear Programming

Chairman: M.A. Saunders

15:00 **269** *Design and Implementation of a New Large Scale Optimization Algorithm and System
G.H. Bradley
G.G. Brown
G.W. Graves

15:30 **270** Large Scale Nonlinear Programming
J. Denel

16:00 **271** Implementing Large Models in Nonlinear Optimization Codes Using Automatic Formula Manipulation
A. Drud

16:30 **272** Optimization of Dynamic Econometric Models Using the GRG-Algorithm
A. Drud

17:00 **273** A Survey of Computational Advances in Dynamic Programming
T-L. Morin

Session 68
Leacock 132

Plenary Session

17:40 Fulkerson Prize Award and General Membership Meeting

Thursday, August 30, morning

Session 69
Leacock 132

Plenary Session

Chairman: R.J.B. Wets

9:00   **274** *Separable Programming, Nonlinear Networks and Duality
R.T. Rockafellar

Session 70
Leacock 110

Non-Smooth Optimization (II)

Chairman: W. Oettli

10:00   **275** *Extension of Lipschitz Functions. Applications to the Minimization of Nonsmooth Functions
J.B. Hiriart-Urruty

10:30   **276** Compactly Lipschitzian Mappings and Mathematical Programming
L. Thibault

11:00   **277** A New Approach for Complete Characterization of Optimality in Nonsmooth Programming
J.J. Strodiot
V. Hien Nguyen

11:30   **278** Submonotone Mappings in Nondifferentiable Optimization
J. Spingarn

12:00   **279** An Optimization Problem with a Max-min Constraint
A.A. de Oliveira

12:30   **280** Low Piece-Linear Approximation and Minimum Conditions in Non-Smooth Mathematical Programming
M.S. Dubson

Session 71
Leacock 14

Network Applications

Chairman: A.M. Geoffrion

10:00   **281** *Network Planning Using Two-Stage Programming Under Uncertainty
A. Prekopa

10:30   **282** *Network Flow Models for Scheduling Problems
M. Segal

11:00   **283** Classification of Network Flow Models and Their Solutions in Engineering Applications
D. Panagiotakopoulos
A.A. Pathak

11:30   **284** A Network Flow Approach for Capacity Expansion Problems with Two Facility Types
H. Luss

12:00   **285** Periodic Networks and Cyclic Capacity Scheduling
J.B. Orlin

Session 72
Leacock 114

Algorithms in Optimal Control

Chairman: J. Cullum

10:00   **286** On a Continuous Time Simplex Method
A.F. Perold

10:30   **287** Linear Programming Solution of the Discrete Stationary Linear Predictor Problem
E.A. Galperin

11:00   **288** Optimization of Piecewise Linear Dynamical Systems
M. Kaltenbach

11:30   **289** Project Management by Means of Optimal Control Theory
S. Hansen

12:00   **290** Numerical Solution of State Constrained Optimal Control Problems by Semi-Infinite Mathematical Programming
L. Paquette

Session 73
Leacock 116

Constrained Optimization (IV)

Chairman: S. Gass

10:00   **291** A Reduced Gradient Method for Quadratic Programs with Quadratic Constraints and Lp-Constrained Lp-Approximation Problems
F. Cole
J.G. Ecker
W. Gochet

10:30   **292** Computing Errors Detection and Control in LP and NLP Codes
P. Tolla

11:00   **293** Reduction Methods in Nonlinear Programming
G. Van der Hoek

11:30   **294** A Hybrid Variable Penalty Method for Constrained Optimization
B. Prasad

12:00   **295** L1 and Chebychev Estimators
G.M. Appa

Thursday morning (continued)

Session 74
Leacock 12

Stochastic Programming (I)

Chairman: M.A.H. Dempster

10:00 **296** 'An Application of Stochastic Duality to Estimation Problems
R.J-B. Wets

10:30 **297** 'On the Numerical Solution of the Stochastic Programming Problem with Complete Fixed Recourse
P. Kall

11:00 **298** 'Feasible Direction Methods for Stochastic Programming Problems
A. Ruszczynski

11:30 **299** 'Stochastic Subgradient Methods
Y. Ermoliev

12:00 **300** 'On the Statistical Models of the Multimodal Functions and Their Application for the Construction of the Minimization Algorithms
A. Zilinskas

Session 75
Leacock 230

Generalized Convexity

Chairman: D.B. Craven

10:00 **301** Generalized Arcwise Connected Functions and Characterizations of Local-Global Minimum Properties
M. Avriel
I. Zang

10:30 **302** 'Generalized Convex Quadratic Functions - A Unified Approach
S. Schaible

11:00 **303** 'Necessary and Sufficient Conditions for Quasi-Convexity and Pseudo-Convexity
J.A. Ferland

11:30 **304** 'Nine Kinds of Concavity and Quasiconcavity Revisited
W.E. Diewert

12:00 **305** About Differentiability of Quasiconvex Functions
J.P. Crouzeix

Session 76
Leacock 219

Non-Linear Integer Programming

Chairman: S. Walukiewicz

10:00 **306** 'Linked Ordered Sets: A New Formulation for Product Terms
E.M.L. Beale
R.C. Daniel

10:30 **307** 'Comparative Study of Some Branch and Bound Algorithms in Integer Nonlinear Optimization
J. Akoka
H. Dayan

11:00 **308** Algorithms for a Variant of the Resource Allocation Problem
N. Katoh
T. Ibaraki
H. Mine

11:30 **309** Postoptimality Analysis in Nonlinear Integer Programming the Right-Hand-Side Case
M.W. Cooper

12:00 **310** 'Best Linear Relaxations for Quadratic 0-1 Optimization
P.L. Hammer
P. Hansen
B. Simeone

Session 77
Leacock 132

Complementarity Problems

Chairman: W.I. Zangwill

10:00 **311** On the Solution of Some Large, Specially Structured Linear Complementarity Problems with Applications
J-S. Pang

10:30 **312** Quadratic Complementarity Problems and Optimal Design of Submarine Pipelines
L. Jurina
C. Lupetti

11:00 **313** Software for a Class of Complementarity and Quadratic Problems. Implementation, Evaluation and Applications in the Field of Structural Engineering
C. Lupetti

Session 78
Leacock 132

Is LP in P?

Chairman: R.M. Karp

11:30 **314** Khacian's Algorithm for Linear Programming
P. Gacs
L. Lovasz

Session 79
Moyse Hall, Arts Bldg.

Algorithms for Linear and Large Scale Programming

Chairman: W. Murray

10:00 **315** 'Solving Large Scale Linear Programs Without Structure
P. Huard

10:30 **316** *On the Solution of a Linear Fractional Programming Problem
B. Mond

11:00 **317** *Morphological Analysis of Linear Programming Algorithms
H. Muller-Merbach

11:30 **318** The First Algorithm for Linear Programming: An Analysis of Kantorovich's Method
C. Van de Panne

12:00 **319** Solving Staircase-Structured Linear Programs by Adaptation of the Simplex Method
R. Fourer

Session 80
Leacock 226

Travelling Salesman and Other Routing Problems

Chairman: M.L. Balinsky

10:00 **320** *The Solution of 100-City Travelling Salesman Problems
A. Land

10:30 **321** *On the Complexity of the Monotone Asymmetric Travelling Salesman Polytope
M. Grotschel
Y. Wakabayashi

11:00 **322** A Procedure for Obtaining Optimal Itineraries for Search and Rescue Vehicles
J.A. Smith

11:30 **323** Determining Extremal Paths Through Probability Fields
R.G. Brusch

Session 81
Leacock 14

Quadratic Programming

Chairman: R.W. Cottle

14:00 **324** *General Quadratic Programming: An Overview and Evaluation
G. Van de Panne

14:30 **325** Gradient Projection Approach for Quadratic Programming with One Constraint
J.A. Ferland
B. Lemaire

15:00 **326** A Numerical Algorithm for Solving Non-Positive-Definite Quadratic Programming Problems
J.R. Bunch
L. Kaufman

15:30 **327** Construction of the Optimal Dual Solution of Quadratic Programmes with Equality Constraints
R. Caron

16:00 **328** Bilinear Programming
I. Czochralska

Session 82
Leacock 12

Multiobjective Optimization (II)

Chairman: W.F. Lucas

14:00 **329** *Some Recent Results on Preference-Ordered Markov Decision Processes
N. Furukawa

14:30 **330** A Two Level Algorithm for Multiobjective Linear Programming
E.C. Duesing

15:00 **331** An Overview of Subjective Programming in Multi-Criterion Decision Making
H. Nakayama

15:30 **332** Interactive Programming Procedure to Solve Multiple Criteria Linear Programming Problem
W. Michalowski

16:00 **333** The Use of Reference Objective or Displaced Ideals in Group Assessment of Solutions of Multiobjective Optimization or Cooperative Game Problems
A.P. Wierzbicki

Session 83
Leacock 230

Applications in the Electric Utility Industry

Chairman: J. Abadie

14:00 **334** *On a Model and a Resolution Approach for the Deterministic Short Term Generation Planning Problem of a Large Hydro-Thermal System
L. Lafond

14:30 **335** *Modelling and Resolution of an Energy Generation Planning Problem for a Hydro Electric System
M. Hanscom

15:00 **336** *Mathematical Programming and Planning in the Electric Utility Industry
J.S. Graves

15:30 **337** *Optimal Operation of a Multireservoir Hydroelectric Power System
J.M. Garcia
A. Turgeon

16:00 **338** Nonlinear Programming Applied to the Optimal Operation of a Hydroelectric Power System
R. Divi
H. Patrung
A. Vallee
M. Vidyasagar
S.R.K. Dutta
D.K. Sen

Session 84
Leacock 219

Unconstrained Optimization (IV)

Chairman: A. Ruszczynski

14:00 **339** *A Suggested Extension of Special Ordered Sets to Non-Separable Non-Convex Programming Problems
J.A. Tomlin

14:30 **340** A B-Conjugate Method for Nonlinear Optimization Without Derivatives
M.L. Lenard

15:00 **341** A Dual Simplex Method for Function Minimization
M. Sato

15:30 **342** Improving Hooke and Jeeves's Pattern Search Method
G. Barabino
M. Marchesi

16:00 **343** On the Control of Numerical Accuracy in Two-Level Optimization Methods
J.M. Szymanowski

Session 85
Leacock 132

Tactical Issues in Linear Programming

Chairman: U. Zimmermann

14:00 **344** *Computational Implications of Degeneracy in Large Scale Mathematical Programming
G.W. Graves
G.G. Brown

14:30 **345** Accelerating Degenerate Simplex Method Iterations by Means of a Basis factorization Algorithm
A.F. Perold

15:00 **346** A Primal Simplex Network Approach Which Circumvents Degeneracy
D.L. Adolphson

15:30 **347** An L.P. 'Crash' Procedure Developed Geometrically
A.J. Pryor

16:00 **348** Some Remarks About Degeneracy in Optimal Solution of Linear Programming Model
J. Merkel

Session 86
Leacock 114

Geometric and Fractional Programming

Chairman: D.P. Bertsekas

14:00 **349** *Computational Experimentation with Primal Geometric Programming Algorithms
M.J. Rijckaert

14:30 **350** Globally Convergent Algorithms for Convex Programming with Applications to Geometric Programming
E. Rosenberg

15:00 **351** Fractional Programming - State of the Art
S. Schaible

15:30 **352** Decomposition Methods for a Class of Non-Linear Fractional Programs
A. Cambini
L. Martein
L. Pellegrini

Session 87
Leacock 116

Control Applications

Chairman: J. Stoer

14:00 **353** *Are Adobe Walls Optimal Phase Shift Filters?
C.V. Coffman
R.J. Duffin
G.P. Knowles

14:30 **354** Application of the GRECO Algorithm to the Optimal Generation Scheduling for Electric Power Systems
J.L.D. Faco

15:00 **355** Management Strategies for an Ecological System with Time Delays
S. Reed
W. Kilmer

15:30 **356** Long Term Decision, Optimal Control and Decision: The Breeder Case
E. Bringuier

Session 88
Leacock 26

Theory of Mathematical Programming (I)
Chairman: R. Schnabel

14:00 **357** *Mathematical Programming and Complementarity Via Generalized Equations
S.M. Robinson

14:30 **358** *Penalty Methods for Computing Points that Satisfy Second Order Necessary Conditions
A. Auslender

15:00 **359** *A Unifying Framework for Duality Theory in Mathematical Programming
J. Tind
L.A. Wolsey

15:30 **360** *Pseudo Duality in Mathematical Programming
U. Passy
S. Yutav

16:00 **361** Minimizing a Differentiable Function Over a Differentiable Manifold
D. Gabay

Session 89
Leacock 226

Routing and Scheduling Problems
Chairman: E.L. Johnson

14:00 **362** *A Report on Future Directions in Routing and Scheduling of Vehicles and Crews
M. Ball
L. Bodin
S. Gass
B. Golden

14:30 **363** *A Decomposition Algorithm for Vehicle Routing
M.L. Fisher
R. Jaikumar

15:00 **364** A School Bus Scheduling System
J.A. Ferland
J-M. Rousseau
J. Desrosiers

15:30 **365** Model of Mail Distribution in Sweden
B. Bjorklund
G. Lundgren

Session 90
Leacock 110

Combinatorial Optimization and Graph Theory
Chairman: F.S. Hillier

14:00 **366** *Critical Graphs, Matchings and Tours
W.R. Pulleyblank

14:30 **367** Sufficient Conditions for Graphs with Threshold Number Two
T. Ibaraki
U. Peled

15:00 **368** Antiblocker of Spanning and k-Spanning Arborescences of a Directed Graph
G. Calvillo

15:30 **369** Adjacency on the Postman Polyhedron
R. Giles

16:00 **370** Blocking Theory in Max-Algebra
L. Superville

Session 91
Leacock 132

Mini Courses - Part II
Chairman: H. Watanabe

16:30 **371** *Pivotal Exchange Methods: Theory, Computation and Applications
H.W. Kuhn

Session 92
Leacock 26

Mini Courses - Part II
Chairman: J.F. Benders

16:30 **372** *Lectures on Multiple Criteria Decision Making
S. Zionts

Session 93
Leacock 219

Mini Courses - Part II
Chairman: G.T. Herman

16:30 **373** *Theoretical Approaches to the Evaluation of Heuristic Combinatorial Algorithms
D.S. Johnson
R.M. Karp

Friday, August 31, morning

Session 94
Leacock 132

Plenary Session

Chairman: C.E. Lemke

9:00   **374** *Production Sets with Indivisibilities, a New Approach to Integer Programming
H. Scarf

Session 95
Leacock 132

Comparison Study of Numerical Methods in Mathematical Programming

Chairman: H.P. Crowder

10:00   **375** *A Class of Methods for Nonlinear Programming
J. Abadie

10:30   **376** *Computational Experience with Minos/Augmented
B. Murtagh
M.A. Saunders

11:00   **377** Computation of the Search Direction in Constrained Optimization Algorithms
W. Murray
M.H. Wright

11:30   **378** *A Unified Theory for Nonlinear Constrained Optimization Methods by Geometric Approach
K. Tanabe

12:00   **379** A Comparison of Some Recent Methods for the Minimization of Unconstrained Nonlinear Functions
G.R. Lindfield
Y. Bhayat

Session 96
Moyse Hall, Arts Bldg.

Nonsmooth Optimization (III)

Chairman: E.A. Nurminski

10:00   **380** *Smoothing Techniques for Nondifferentiable Optimization
I. Zang

10:30   **381** *A Second Order Method to Solve the (Constrained) Minimax Problem
A.R. Conn

11:00   **382** Minimax Optimization Combining LP Methods and Quasi-Newton Methods
J. Hald
K. Madsen

11:30   **383** Quasi-Newton Methods for Minimax Optimization
C. Charalambous
O. Moharram

12:00   **384** Projected Lagrangian Algorithms for the Nonlinear Minimax and L1 Problems
W. Murray
M.L. Overton

Session 97
Leacock 230

Convex Programming (III)

Chairman: M. Avriel

10:00   **385** *Minimization Methods for the Sum of a Convex Function and a Continuously Differentiable Function
M. Fukushima

10:30   **386** *A Secant Approximation Method for Convex Optimization
R.R. Meyer

11:00   **387** Uses of a Minimax Model for Nondifferentiable Optimization
R.S. Womersley

11:30   **388** Two-Segment Separable Programming
R.R. Meyer

12:00   **389** On the Dynamics of Concave Input/Output Processes
J.J.M. Evers

Session 98
Leacock 116

Non Cooperative and Recursive Games

Chairman: H.P. Young

10:00   **390** Equilibria in Non-Cooperative Games and Competitive Economies
S.D. Flam

10:30   **391** Linear-Quadratic Stochastic Games
G.J. Olsder

11:00   **392** Dubovitskii-Milyutin Theory for Differential Games
M. Brokate

11:30   **393** On Repeated Games with Incomplete Information Played by non- Bayesian Players
N. Megiddo

Session 99
Leacock 14

Strategic Planning for an Industrial Sector

Chairman: A.N. Elshafei

10:00   **394** *Strategic Planning by Mathematical Programming
P. Bod

10:30 **395** *Allocation and Control of Radio and TV Production Via Quantitative Management Methods
F.A. Lootsma

11:00 **396** A Planning Model for a Vertically Integrated Forest Industry
O. Barros
A. Weintraub

11:30 **397** Use of Linear Programming in Integrated Planning - A Case Study from the Egyptian Industry
A.N. Elshafei

12:00 **398** An LP-Model for Natural Processes with Seasonal Fluctuations in Production and/or Marketing Possibilities
N.Chr. Knudsen

Session 100
Leacock 12

Location Problems

Chairman: A.H.G. Rinnooy Kan

10:00 **399** *Capacitated Plant Location and Network Problems with Integer Variables
M. Guignard
K. Spielberg

10:30 **400** A Canonical Representation of Uncapacitated Plant Location Problems and Its Applications
G.P. Cornuejols
G.L. Nemhauser
L.A. Wolsey

11:00 **401** An Exact Algorithm for Minimizing Delivery and Operating Costs in Depot Location
G. Laporte
Y. Nobert

11:30 **402** Variations on a Theme of Weber - 1. Theorems
P. Hansen

12:00 **403** Variations on a Theme of Weber - 2. Algorithms
D. Peeters

Session 101
Leacock 226

Combinatorial Theory and Matroids

Chairman: M. Segal

10:00 **404** *Matroid Matching and Applications
L. Lovasz

10:30 **405** *Integer Rounding for Polymatroid and Branching Optimization Problems
S. Baum
L.E. Trotter

11:00 **406** *On the Number of Complementary Bases in a Matroid
J. Fonlupt

11:30 **407** Leontief Substitution Systems and Matroid Complexes
J.S. Provan
L.J. Billera

12:00 **408** *Some Remarks Concerning Combinatorial Optimization Problems
M.W. Padberg

Session 102
Leacock 219

Fixed Point Theory

Chairman: C.E. Lemke

10:00 **409** *Path Following in Fixed Points and Solutions
W.I. Zangwill

10:30 **410** *A Constructive Proof of Tucker's Combinatorial Lemma
M.J. Todd

11:00 **411** *Monotone Complementarity Problems
L. Mclinden

11:30 **412** A Unification and Generalization of the Eaves and Kojima Fixed Point Representations of the Complementarity Problem
S-C. Fang
E.L. Peterson

12:00 **413** Graphs Related to the Fixed Point Algorithms
L. Filus

Session 103
Leacock 110

Knapsack Problems

Chairman: Y. Sekiguchi

10:00 **414** *An Algorithm for Solving Bilinear Knapsack Problems
H. Konno

10:30 **415** A Stability Concept of 0-1 Programming Problems and its Implications
M.J. Magazine
O. Oguz

11:00 **416** On the Collapsing 0-1 Knapsack Problem
D. Fayard
G. Plateau

11:30 **417** Probabilistic Analysis of the Knapsack Problem
G. d'Atri
C. Puech

12:00 **418** On Multiconstrained Knapsack Problem
Y.P. Aneja
V. Aggarwal
K.P.K. Nair

Session 104
Leacock 114

Applications to Computer Systems

Chairman: M.J. Rijckaert

10:00 **419** *Reducing Micro-Data Files by Optimization or by Stratified Sampling
J.M. Mulvey

10:30 **420** *Optimal Location of Files and Programs in Computer Networks
P. Carraresi
G. Gallo

11:00 **421** Multiprocessor Scheduling Using a Directed Acyclic Graph and a Shortest Path Algorithm
C.C. Price

11:30 **422** Programming Techniques Supportive of Better Communication Between the User and the Analyst in the Construction of Computerized Models
D.M. Homa

12:00 **423** Creating Optimal Composite Microdata Files with Large-Scale Mathematical Programming
R.S. Barr
J.S. Turner

Session 105
Leacock 114

Stochastic Programming - Theory (II)

Chairman: J.A. Ferland

14:00 **424** Average Costs Denumerable State Semi-Markov Decision Problems with Unbounded Costs, Recurrence Conditions and Optimality Results
H.C. Tijms

14:30 **425** Monte Carlo Simulation of Optimization Algorithms
J.L. Farrah

15:00 **426** Duality in Chance Constrained Programming
L.C. Maclean

15:30 **427** Stochastic Approximation Minimization Procedures with Dependent Disturbances
P.J. Szablowski

16:00 **428** Service Policies in a Queueing Network with Exponential Service Stations
Z. Rosberg

Session 106
Leacock 230

Specific Problems in Nonlinear Programming

Chairman: R. Mifflin

14:00 **429** *Entropy in Linear Programs
S. Erlander

14:30 **430** *Extremal Programming and the Principal-Agent Problem
G.J. Koehler
A.B. Whinston

15:00 **431** *A Study on an Optimal Allocation Problem Having a Strictly Convex Cost Function
A. Ouchi
I. Kaji

15:30 **432** *Sylvester's Minimum Circle Problem Revisited
D.W. Hearn
J. Jesunathadas

16:00 **433** A Limiting Infisup Theorem
C.E. Blair
R.J. Duffin
R.G. Jeroslow

Session 107
Leacock 12

Matrix Analysis

Chairman: R.W.H. Sargent

14:00   **434**   *Polynomial Algorithms for Computing the Smith and Hermite Normal Forms of an Integer Matrix
A. Bachem
R. Kannan

14:30   **435**   Inverse Matrix Representation with One Triangular Array
S. Ursic

15:00   **436**   Invariance and the Product of the Eigenvalues
J. Donato

15:30   **437**   Size of Intermediate Numbers in Certain Numerical Computations
R. Kannan
A. Bachem

Session 108
Leacock 14

Theory of Mathematical Programming (II)

Chairman: F.H. Clarke

14:00   **438**   *Theorems of Alternative and Decomposition of Convex and Nonconvex Programs
F. Giannessi

14:30   **439**   Tangential Approximations in Abstract Multiplier Rules
R.J. Gardner
D.H. Martin

15:00   **440**   On Tents and Other Notions of Tangential Conical Approximants
G.G. Watkins

15:30   **441**   Sufficient Optimality Criteria in Nonlinear Optimization
A. Capozzi
C. Resina

Session 109
Leacock 116

Computer Aspects of Mathematical Programming

Chairman: R.E. Marsten

14:00   **442**   *Peruse: An Interactive System for Mathematical Programs
R.P. O'Neill
W. Kurator

14:30   **443**   A Linear Programming Algorithm for a Parallel Processing Computer
B.L. Stults
D.R. Landolt

15:00   **444**   An Equivalence Concept for Establishing Linear Programs
W.R.S. Sutherland

15:30   **445**   Validity of Simulations: Optimal Simulation Lengths for Means Computation by Various Algorithms
M. Becker

16:00   **446**   New Developments in Matrix / Report Generators
C.A. Haverly

Session 110
Leacock 26

Applications in Mathematical Programming

Chairman: A.C. Williams

14:00   **447**   *Principles of Apportionment
H.P. Young

14:30   **448**   *Nonlinear Programming Estimation of the Cost of Decent Subsistence
J.L. Balintfy

15:00   **449**   Dynamic Water Quality Management Using Nonlinear Ecological Models
Y. Smeers
S. Olivieri

15:30   **450**   Menu Scheduling by Lagrangian Relaxation
J.K. Balintfy
P. Sinha

16:00   **451**   Equi-Assigned Sequences and Explicit Solution of an Integer Program. A Proposal for Generating and Recognizing a Particular Language
A. Volpentesta

Session 111
Leacock 110

Special Methods in Integer Programming

Chairman: J.K. Lenstra

14:00   **452**   A Review on Taha's General Algorithm
R.E. Campello
N. Maculan

14:30   **453**   A Decomposition Method for Quadratic Fixed-Charge Problems Applications to a Submarine Pipeline Design Problem
F. Arcangeli
L. Pellegrini

15:00   **454**   Generating Facets in the Fourier-Motzkin Elimination Method
I.G. Rosenberg

15:30   **455**   A Penalty Function Approach to Integer and Mixed Integer Programming
P. O'Neill

16:00 **456** A Diophantine Method for Integer Programming
G.J. Turbay-Bernal

Session 112
Leacock 219

Combinatorial Location Problems

Chairman: J.J.H. Forrest

14:00 **457** *A Nonconvex Problem in Optimal Location
Theory: Location with Forbidden Regions
L. Cooper
I.N. Katz

14:30 **458** *Maximizing Submodular Set Functions:
Formulations and Analysis of Algorithms
G.L. Nemhauser
L.A. Wolsey

15:00 **459** *Pairwise Separable Programming
E.V. Denardo
G. Huberman
U.G. Rothblum

15:30 **460** Efficient Algorithms for Locating Centers on Tree
Networks
R. Chandrasekaran
A. Tamir

16:00 **461** The k-Median Problem: Worst-Case and
Probabilistic Analysis
C.H. Papadimitriou
D.S. Hochbaum

Session 113
Leacock 132

Network Equilibrium

Chairman: T. Ibaraki

14:00 **462** *Traffic Equilibrium and Variational Inequalities
S. Dafermos

14:30 **463** *Equilibria for Network Planning: A Survey
T.L. Magnanti

15:00 **464** *Continuum Approximation to Dense Networks
and Its Application to the Analysis of Urban Road
Networks
A. Taguchi
M. Iri

15:30 **465** *Synthesizing Network Equilibrium and Design
Models for Location of Urban Activities
D.E. Boyce
L.J. Leblanc

16:00 **466** A New Paradox in Wardrop's User Equilibrium
Assignment: How an Increase in Automobile Travel
Demand Will Produce a Decrease in Global Travel Costs
C. Fisk
S. Pallottino

Session 114
Leacock 226

Data and Image Analysis

Chairman: M. Jeffreys

14:00 **467** *Mathematical Optimization Versus Practical
Performance: a Case Study Based on the Maximum
Entropy Criterion in Medical Image Reconstruction
G.T. Herman

14:30 **468** Digital Image Restoration Using Quadratic
Programming
N.N. Abdelmalek
T. Kasvand

15:00 **469** Simulative Evaluation of Learning System
Identification Algorithms
H. Watari
D.E. Scott

15:30 **470** Optimization in Data Analysis
P. Michaud
F. Marcotorchino

16:00 **471** Optimization in Data Analysis (Heuristic Methods)
F. Marcotorchino
P. Michaud