



Association Française pour l'Etude des Eaux

DOCUMENT NON SELECTIONNE

NUMERO F_5797

Trop spécialisé
Sans intérêt
Pas de mon domaine
Pas le temps

NOM: M. le Prof. M. A. L. M.

DATE ENVOI: 03/07/89

DATE RETOUR: 03/07/89

LANGUE (S)

A

DOCUMENT SELECTIONNE

661 65510

Titre de la revue ou Editeur de l'ouvrage

SOUTHAMPTON, CMP, CONF. MIT, 1988/06, CAMBRIDGE,

THEME (S)

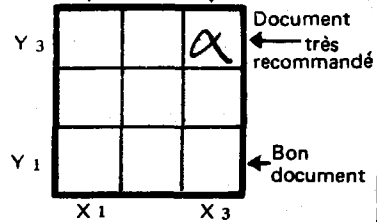
Date de parution 1988, n° 36,

Pages : Début 480 P. Fin

Auteur (s) CELIA M.A., FERRAND L.A., BREBBIA C.A. -

Pour non spécialiste

Pour spécialiste



Z

Titre original : CONFERENCE. COMPUTATIONAL METHODS IN WATER RESOURCES. VOL. 2
NUMERICAL METHODS FOR TRANSPORT AND HYDROLOGIC PROCESSES.

Titre traduit : ~~METHODS~~ ^{DE CALCUL} ~~NUMERICAL~~ DES RESSOURCES EN EAU-VOL
METHODES NUMERIQUES POUR LES PROCESUS DE
TRANSPORT ET D'HYDROLOGIE

DESкрипTEUR(S)

(pris dans le Thésaurus National-Eau) et éventuellement MOTS-LIBRES

COMMENTAIRE

(Micro résumé de 30 mots environ)

MODELE MATHEMATIQUE

TENDANCES ACTUELLES DES MODELES

SIMULATION

2D et 3D EN HYDROLOGIE - DEUR

PREVISION

LOPPENT D'ALGORITHMES PLUS

Eau SOUTERRAINE

FIABLES ET PLUS RAPIDES - EXEM.

Eau SUPERFICIELLE

PLE DE COUPLAGE AVEC LES TECHNIQUES

RECHERCHE OPERATIONNELLE

D'OPTIMISATION - NOMBREUX EXEMPLES

DIFFUSION

D'APPLICATION POUR LES NAPPES

POLLUTION DE NAPPE

ET POUR LES LACS ET RIVIERES

OPTIMISATION

~~RECHERCHE~~ MULTIS NON SATURE

RESSOURCES EN EAU

MANIA

66 / 655 10

DEVELOPMENTS IN WATER SCIENCE

36

Editors: M.A. Celia, L.A. Ferrand, C.A. Brebbia, W.G. Gray,
G.F. Pinder

COMPUTATIONAL METHODS IN WATER RESOURCES

VOL. 2 NUMERICAL METHODS FOR TRANSPORT AND HYDROLOGIC PROCESSES

Proceedings of the VII International Conference, MIT, USA,
June 1988

F. 5797

COMPUTATIONAL MECHANICS PUBLICATIONS
ELSEVIER

PREFACE

This book forms part of the edited proceedings of the Seventh International Conference on Computational Methods in Water Resources (formerly Finite Elements in Water Resources), held at the Massachusetts Institute of Technology, USA in June 1988. The conference series originated at Princeton University, USA in 1976 as a forum for researchers in the emerging field of finite element methods for water resources problems. Subsequent meetings were held at Imperial College, UK (1978), University of Mississippi, USA (1980), University of Hannover, FRD (1982), University of Vermont, USA (1984) and the Laboratório Nacional de Engenharia Civil, Portugal (1986). The name of the ongoing series was modified after the 1986 conference to reflect the increasing diversity of computational techniques presented by participants.

The 1988 proceedings include papers written by authors from more than twenty countries. As in previous years, advances in both computational theory and applications are reported. A wide variety of problems in surface and sub-surface hydrology have been addressed.

The organizers of the MIT meeting wish to express special appreciation to featured lecturers J.A. Cunge, A. Peters, J.F. Sykes and M.F. Wheeler. We also thank those researchers who accepted our invitation to present papers in technical sessions: R.E. Ewing, G. Gambolati, I. Herrera, D.R. Lynch, A.R. Mitchell, S.P. Neuman, H.O. Schiegg, and M. Tanaka. Important contributions to the conference were made by the organizers of the Tidal Flow Forum (W.G. Gray and G.K. Verboom) and the Convection-Diffusion Forum (E.E. Adams and A.M. Baptista) and by K. O'Neill who organized the Special Session on Remote Sensing. The conference series would not be possible without the continuing efforts of C.A. Brebbia, W.G. Gray and G.F. Pinder, who form the permanent organizing committee.

The committee gratefully acknowledges the sponsorship of the National Science Foundation and the U.S. Army Research Office and the endorsements of the American Geophysical Union (AGU) the International Association of Hydraulic Research (IAHR), the National Water Well Association

cations UK
cations USA

ther the whole or part of the material is
of illustrations, broadcasting, reproduc-
in data banks.

tion does not imply, even in the absence
relevant protective laws and regulations

(NWN), the American Institute of Chemical Engineers (AIChE), the International Society for Computational Methods in Engineering (ISCME), the Society for Computational Simulation (SCS) and the Water Information Center (WIC).

Papers in this volume have been reproduced directly from the material submitted by the authors, who are wholly responsible for them.

M.A. Celia
L.A. Ferrand
Cambridge (USA) 1988

SECTION 1 - DEVELOPMENTS IN NUMERICAL METHODS

1A - Numerical Methods for Transport

- | | |
|---|----|
| Stability Analysis of Discrete Approximations of the Advection-Diffusion Equation Through the use of an Ordinary Differential Equation Analogy
<i>A.A. Aldama</i> | 3 |
| Solution of the Advection-Diffusion Transport Equation using the Total Derivative and Least Squares Collocation
<i>L.R. Bentley, G.F. Pinder and I. Herrera</i> | 9 |
| An Analysis of Some Classes of Petrov-Galerkin and Optimal Test Function Methods
<i>E.T. Bouloutas and M.A. Celia</i> | 15 |
| The Cell Analytic-Numerical Method for Solution of the Two-Dimensional Advection-Dispersion Equation
<i>O.A. Elnawawy, A.J. Valocchi and A.M. Ougouag</i> | 21 |
| INVITED PAPER
Finite Element Techniques for Convective-Diffusive Transport in Porous Media
<i>R.E. Ewing</i> | 27 |
| INVITED PAPER
3-D Finite Element Transport Models by Upwind Preconditioned Conjugate Gradients
<i>G. Pini, G. Gambolati and G. Galeati</i> | 35 |
| The Structure of Mass-Response Functions of Dissolved Species in Hydrologic Transport Volumes
<i>A. Rinaldo, A. Bellin and A. Marani</i> | 45 |
| An Advection Control Method for the Solution of Advection-Dispersion Equations
<i>Ne-Zheng Sun and Wen-Kang Liang</i> | 51 |
| Non-Diffusive N+2 Degree Upwinding Methods for the Finite Element Solution of the Time Dependent Transport Equation
<i>J.J. Westerink, M.E. Cantekin and D. Shea</i> | 57 |

Characteristic Alternating Direction Implicit Scheme for Advection-Dispersion Equation <i>Yuqun Xue and Chunhong Xie</i>	63	Guidelines for the use of Preconditioned Conjugate Gradients in Solving Discretized Potential Flow Problems <i>E.F. Kaasschieter</i>	147
A Zoomable and Adaptable Hidden Fine-Mesh Approach to Solving Advection-Dispersion Equations <i>G.T. Yeh</i>	69	INVITED PAPER Non Linear Instability in Long Time Calculations of a Partial Difference Equation <i>A.R. Mitchell</i>	153
1B - Computational Fluid Dynamics		The Numerical Treatment of Partial Differential Equations by the Parallel Application of a Hybrid of the Ritz-, Galerkin-Product Integral Methods <i>N.L. Petrakopoulos</i>	161
A Taylor Weak Statement CFD Algorithm for Free Surface Hydromechanical Flows <i>A.J. Baker and G.S. Iannelli</i>	77	Fractional Steps and Process Splitting Methods for Industrial Codes <i>J.M. Usseglio-Polater and M.I. Chenin-Mordojovich</i>	167
Numerical Simulation of the Vortex Shedding Process Past a Circular Cylinder <i>A. Giorgini and G. Alfonsi</i>	83	On the Construction of N-th Order Functions for Complete Interpolation <i>S.Y. Wang, K.K. Hu, P.G. Kramer and S.E. Swartz</i>	173
Numerical Investigation of Turbulent Flow Field in a Curved Duct with an Alternating Pressure Difference Scheme <i>Z.J. Liu, C.G. Gu and Y.M. Miao</i>	89	SECTION 2 - TRANSPORT	
Turbulent Diffusion Simulation by Implicit Factored Solver using K- ϵ Model <i>F. Martelli and V. Michelassi</i>	95	2A - Solute Transport in Saturated Porous Media	
INVITED PAPER A Boundary Element Investigation of Natural Convection Problems <i>M. Tanaka, K. Kitagawa, C.A. Brebbia and L.C. Wrobel</i>	103	INVITED PAPER Three-Dimensional Adaptive Eulerian-Lagrangian Finite Element Method for Advection-Dispersion <i>R. Cady and S.P. Neuman</i>	183
1C - Numerical Analysis		Computer Modeling of Groundwater Flow Through Porous Media using a Monte-Carlo Simulation Technique <i>J.S. Loitherstein</i>	195
A New Family of Shape Functions <i>S.E. Adeff</i>	117	Dispersion of Contaminants in Saturated Porous Media: Validation of a Finite-Element Model <i>G.L. Moltyaner</i>	201
Adaptive Collocation for Burgers' Equation <i>M.B. Allen III and M.C. Curran</i>	123	Modeling Water and Contaminant Transport in Unconfined Aquifers <i>G. Pantelis</i>	207
Alternative Ways of Treating Domain Integrals in Boundary Elements <i>C.A. Brebbia</i>	129	Accurate Fine-Grid Simulations to Derive Coarse-Grid Models of Fine-Scale Heterogeneities in Porous Media <i>T.F. Russell</i>	213
INVITED PAPER Advances on the Numerical Simulation of Steep Fronts <i>I. Herrera and G. Hernández</i>	139		

Numerical Experiment with Euler-Lagrange Method for a Pair of Recharge-Pumping Wells <i>S. Sorek</i>	219
On the Use of Particle Tracking Methods for Solute Transport in Porous Media <i>A.F.B. Tompson and D.E. Dougherty</i>	227
2B - Solute Transport in Unsaturated Porous Media	
Mass Exchange Between Mobile Fresh Water and Immobile Saline Water in the Unsaturated Zone <i>H. Gvirtzman and M. Magaritz</i>	235
Solution of Saturated-Unsaturated Flow by Finite Element or Finite Difference Methods Combined with Characteristic Technique <i>Kang-Le Huang</i>	241
Finite Element Simulation of Nitrogen Transformation and Transport during Hysteretic Flow with Air Entrapment <i>J.J. Kaluarachchi and J.C. Parker</i>	247
A Characteristic Finite Element Model for Solute Transport in Saturated-Unsaturated Soil <i>Jin-Zhong Yang and Wei-Zhen Zhang</i>	255
2C - Chemical Processes	
Solute Transport: Equilibrium vs Non-equilibrium Models <i>R. Abeliuk</i>	263
Confrontations Between Computer Simulations and Laboratory Work to Understand Mechanisms Controlling Transport of Mercury <i>Ph. Behra</i>	269
A Quick Algorithm for the Dead-End Pore Concept for Modeling Large-Scale Propagation Processes in Groundwater <i>H.M. Leismann, B. Herrling, V. Krenn</i>	275
Simulation of Groundwater Transport Taking into Account Thermodynamical Reactions <i>B.J. Merkel, J. Grossmann and A. Faust</i>	281

Multicomponent Solute Transport with Moving Precipitation/Dissolution Boundaries <i>J.A. Mundell and D.J. Kirkner</i>	287
The Advantage of High-Order Basis Functions for Modeling Multicomponent Sorption Kinetics <i>J.A. Pedit and C.T. Miller</i>	293
2D - Heat Transport	
A Finite Element Model of Free Convection in Geological Porous Structures <i>D. Bernard</i>	301
Radiative Heat Transfer to Flow in a Porous Pipe with Chemical Reaction and Linear Axial Temperature Variation <i>A.R. Bestman</i>	307
Assessment of Thermal Impacts of Discharge Locations using Finite Element Analysis <i>Y.C. Chang and D.P. Galya</i>	313
Validation of Finite Element Simulation of the Hydrothermal Behavior of an Artificial Aquifer Against Field Performance <i>H. Daniels</i>	319
Numerical Modeling of Hot Water Storage in Aquifer by Finite Element Method <i>B. Goyeau, J. Gounot and P. Fabrie</i>	325
Modelling the Regional Heat Budget in Aquifers <i>J. Trösch and H. Müller</i>	331
A Thermal Energy Storage Model for a Confined Aquifer <i>Yuqun Xue, Chunhong Xie and Qingfen Li</i>	337
SECTION 3 - HYDROLOGY	
3A - General Hydrology	
Numerical Analysis of Transients in Complex Hydropower Scheme <i>S.A. Furlani and G.J. Corrêa</i>	345
Some Aspects of Kalman Filtering Application in Hydrologic Time Series Processing <i>M. Markuš and D. Radojević</i>	351

A Computer Model for the Estimation of Effluent Standards for Priority Pollutants From a Wastewater Discharge Based Upon Aquatic Life Criterion of the Receiving Stream <i>J.R. Nuckols, S.F. Thomson and A.G. Westerman</i>	357
Network Model Assessment to Leakage of Fill Dam <i>T. Sato and T. Uno</i>	363
3B - Parameter Estimation	
Groundwater Monitoring Network Design <i>H.A. Loaiciga</i>	371
Adjoint-State and Sensitivity Coefficient Calculation in Multilayer Aquifer System <i>A.H. Lu, C. Wang and W. W-G. Yeh</i>	377
Identification of IUII Ordinates Through Non-Linear Optimization <i>J.A. Raynal Villasenor and D.F. Campos Aranda</i>	385
3C - Optimization	
Numerical Aspects of Simulation and Optimization Models for a Complex Water Resources System Control <i>M. Baošić and B. Djordjević</i>	393
Optimal Operation of a Reservoir System with Network Flow Algorithm <i>P.B. Correia and M.G. Andrade Filho</i>	399
Optimization of Water Quality in River Basin <i>I. Dimitrova and J. Kosturkov</i>	405
Coupling of Unsteady and Nonlinear Groundwater Flow Computations and Optimization Methods <i>A. Heckeles and B. Herrling</i>	411
Reliability Constrained Markov Decision Programming and its Practical Application to the Optimization of Multipurpose Reservoir Regulation <i>Liang Qingfu</i>	417
Optimal Multiobjective Operational Planning of a Water Resources System <i>S. Soares and M.G. Andrade Filho</i>	423

A Flexible Polyhedron Method with Monotonicity Analysis <i>Shu-yu Wang and Zhang-lin Chen</i>	431
3D - Software Developments	
A Software Package for the Computer Aided Design of Sewer Systems <i>W. Bauwens</i>	439
Interactive Design of Irregular Triangular Grids <i>R.F. Henry</i>	445
FLOSA - 3FE: Velocity Oriented Three-Dimensional Finite Element Simulator of Groundwater Flow <i>M. Nawalany</i>	451
Reliable System Software for the Micro-Processor Based Hydrometeorological Network for Real Time Stream Flow and Flood Forecasting in Narmada Basin in India <i>R.S. Varadarajan</i>	459

Companion Volume:

Modeling Surface and Sub-surface Flows, Vol. 1 of **Computational Methods in Water Resources 1988**, contains featured lectures by recognised authorities in the field as well as sections on **Modeling Saturated and Unsaturated Flow in Porous Media**, **Multiphase Flow**, **Stochastic Models**, **Salt Water Intrusion**, **Modeling Surface Water Flows** such as **Tidal Models**, **Lake and Estuary Models**, **Open Channel Flow and Sedimentation**, and **Remote Sensing and Signal Processing for Hydrological Modeling**.

ISBN 1-85072-002-3 CMB
ISBN 0-444-90511-0 ELSEVIER