

CONTENTS

PREFACE

SECTION 1

COUPLED NUMERICAL TECHNIQUES

1.	A.R.MITCHELL and S.W.SCHOOMBIE	3
	Finite element studies of solitons	
2.	D.J.EVANS and A.DANAEE	21
	A block hopscotch method for solving partial differential equations	
3.	L.E.GOODRICH	40
	Evaluation of least squares time stepping procedures for transient field problems	
4.	P.B.HOWELLS and R.H.MARSHALL	49
	A fast and accurate integration scheme for coupled stiff differential equations	
5.	R.S.WIKRAMARATNA and W.L.WOOD	60
	On the coupled equations of the groundwater quality problem	
6.	G.K.VERBOOM, G.S.STELLING and M.J.OFFICIER	71
	Non-reflective boundary conditions in horizontal flow models	
7.	J.K.DUKOWICZ	82
	Lagrangian fluid dynamics using the Voronoi-Delaunay mesh	
8.	C.PATTERSON and N.I.BAGDATLIOGLU	105
	On the use of coupled numerical methods for refined structural analysis	
9.	C.PATTERSON and M.A.SHEIKH	115
	A regular boundary element method for coupled subdomains	

10.	R.I.TANNER and H.B.PHOUC Analysis of fibre spinning	127
11.	T.S.CHUA and P.M.DEW The simulation of a gas transmission network using a variable-step integrator	137
12.	D.R.J.OWEN and J.M.M.C.MARQUES Coupled implicit-explicit time integration with frontal substructuring in two-dimensional quasistatic elasto-viscoplasticity	147
13.	V.H.JOSHI and J.J.EMERY Solving equations of motion for boundary value problems	161
14.	M.RAFFY On some iterative methods for nonlinear coupled problems	173

SECTION 2

FLUID-STRUCTURE INTERACTION

1.	R.W.CLOUGH and C.H.CHANG Seismic cavitation of gravity dam reservoirs	185
2.	A.V.JONES The stability of fluid-structure coupling in lagrangian coordinates	197
3.	D.N.BURAGOHAİN and B.L.AGRAWAL Hydrodynamic forces on large offshore structures under ground excitation	209
4.	B.NATH Coupled natural frequencies of arch dam reservoir systems by a mapping finite element method	222
5.	R.DUNGAR Fluid-structure interaction modelling in the aseismic design of the 226m El Cajon arch dam	234
6.	I.G.BRYDEN and C.A.GREATED Dynamics of semi-submerged cylinders in waves	246
7.	M.N.SAYHI and Y.OUSSET A direct determination of the added-mass matrix in fluid-structure interaction problems	255

8.	X.LU and R.W.CLOUGH A hybrid substructure approach for analysis of fluid-structure interaction in ship vibrations	269
9.	R.EATOCK TAYLOR and J.ZIETSMAN Implementation of coupled formulations for hydrodynamic analysis in three dimensions	281
10.	R.E.BALL and W.J.STRONGE Accuracy of piston theory for fluid-backed plates	293
11.	C.CARRETTA, M.COUSTON and J.J.ANGELINI Simultaneous resolution of aerodynamic and aeroelastic equations of motion for transonic two-dimensional airfoils	304
12.	H.NEISHLOS, M.ISRAELI and Y.KIVITY A coupling algorithm for fluid and structure with different time steps	313
13.	D.K.PAUL, O.C.ZIENKIEWICZ and E.HINTON Transient dynamic analysis of reservoir-dam interaction using staggered solution schemes	321
14.	R.OHAYON and R.VALID True symmetric formulations of free vibrations of fluid-structure interaction - applications and extensions	335
15.	G.DELHOMMEAU, B.PESEUX and J.P.QUEVAT Natural frequencies of immersed plates evaluated by a mixed method. Finite element method and boundary integral method	346
16.	S.BRCIC Three-dimensional time response of thin-walled circular cylinder to fluid flow	356
17.	S.S.DESHPANDE, R.M.BELKUNE and C.K.RAMESH Dynamic analysis of coupled fluid-structure interaction problems	367
18.	M.P.PAKSTYS Application of fluid-structure interaction methods to ocean vehicles exposed to impact loading	379
19.	P.V.THANGUM BABU and D.V.REDDY A numerical integration scheme for solving coupled equations of fluid-structure interaction systems	388

20.	J.ALLAIS, P.BICHET, J.CHAIX and J.RIGAUDEAU	398
	Industrial application of FEM to linear fluid structure interaction in seismic response of nuclear components	

SECTION 3

STRUCTURE—STRUCTURE INTERACTION

1.	J.H.ARGYRIS and J.St.DOLTSINIS	413
	Numerical treatment of large deformation processes exhibiting thermal and mechanical couplings	
2.	K.C.PARK	416
	An improved semi-implicit algorithm for structural dynamics	
3.	L.R.HERRMANN and R.A.SCHAMBER	418
	Finite element analysis of layered systems with edge effects	
4.	N.KIKUCHI and J.E.TAYLOR	430
	Shape optimization for unilateral elastic contact problems	
5.	E.STEIN and P.WRIGGERS	442
	Incremental calculation of frictional impact-contact problems with application to elastic rods and shells	
6.	W.BROCKS and H.D.NOACK	454
	Three dimensional elastic plastic finite element analysis of a nozzle corner crack	
7.	M.TUOMALA, D.R.J.OWEN, O.C.ZIENKIEWICZ and S.NAKAZAWA	466
	A penalty function finite element method in nonlinear elasticity	
8.	P.LE TALLEC	478
	Contact between largely deformed incompressible hyperelastic solids and rigid bodies	
9.	P.K.SYAMAL and O.A.PEKAU	490
	Lateral-torsional coupling in dynamic response of structures	
10.	A.MARTIN, A.MILLARD and A.RICARD	501
	The intermittent contact impact problem in piping systems of nuclear reactors	

11.	G.MEDRA and A.STROZZI	512
	Influence of finite deformations on stress concentrations in plane stress	
12.	G.ASKU	523
	A finite difference method for the free vibration of orthotropic plates allowing for transverse shear deformation and rotatory inertia	
13.	M.S.EL NASCHIE, S.AL ATHEL, R.L.AL ZAID and W.WU	535
	Numerical and topological analysis for divergence and Hopf bifurcation of elastic systems	

SECTION 4

GEOTECHNICAL COUPLINGS

1.	I.M.SMITH	549
	Some coupled problems of structure-soil interaction	
2.	J.C.BRUCH and J.M.SLOSS	567
	A free boundary value problem solved as a coupled problem	
3.	H.CRAMEER and W.WUNDERLICH	578
	Numerical treatment of rock-structure interaction problems with combined material laws	
4.	H.L.JESSBERGER, E.MAKOWSKI and W.EBEL	591
	Calculation of frozen soil structures considering the temperature dependent strength and creep behaviour of frozen soil	
5.	G.BEER and J.L.MEEK	605
	Coupled finite element - boundary element analysis of infinite domain problems in geomechanics	
6.	F.MEDINA	630
	Direct finite element method for linear soil-structure interaction	
7.	Y.MEIMON, P.A.THOMAS, J.C.NAUDIN and C.PEROL	643
	Calculation of the soil structure contact of jack up foundations	
8.	H.YOUSSEF	655
	Pile response to vertical vibration	
9.	D.N.BURAGOHAIN and V.L.SHAH	665
	Finite element analysis of plates of arbitrary shapes on elastic half space	

10.	N.G.R.IYENGAR, M.R.MADHAV and S.CHANDRA Coupled numerical method for plates on elastic foundation	675
11.	A.CIVIDINI An alternative finite element approach for soil consolidation	688
12.	D.KOVACIC, B.SKORO, N.GRUBIC, I.SORIC and D.NARDINI Soil-structure interaction by modified Winkler model	699
13.	A.B.MOUSSA and R.S.SANDHU Nonlinear formulation for the coupled problem of flow and large deformation in unsaturated porous media	716

SECTION 5

ACOUSTICAL COUPLINGS

1.	I.C.MATHEWS and G.G.W.MUSTOE Three dimensional acoustic radiation	731
2.	M.EL-RAHEB Vibration of a thin elastic cylinder with internal acoustic field	742
3.	P.L.COUSINS Boundary integral solutions of three-dimensional acoustic modes in box-like cavities	754

SECTION 6

LUBRICATION COUPLINGS

1.	B.R.REASON and A.H.SIEW A numerical solution to the coupled problem of the hydrodynamic porous journal bearing	769
2.	S.C.JAIN, R.SINHASAN and D.V.SINGH EHD-analysis of plain slider bearing having flexible porous bearing pad	781
3.	S.C.JAIN, R.SINHASAN and D.V.SINGH Effect of elastic deformation of bearing surface on the performance of hydrodynamic journal bearing	793
4.	C.WU A numerical method for mixed lubrication	805

SECTION 7

THERMAL COUPLINGS

- | | | |
|----|-------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 1. | E.A.THORNTON, P.DECCHAUMPHAI and K.K.TAMMA
Integrated thermal-structural analysis of structures | 817 |
| 2. | J.H.TULP, H.DE BRUIJN and W.ZIJL
Least squares finite element computation of the
thermal-hydraulic behaviour of a decay heat cooler | 828 |
| 3. | L.MANI and K.N.SHUKLA
Application of finite element method to non-linear
heat conduction problems | 840 |
| 4. | S.NAKAZAWA and O.C.ZIENKIEWICZ
Finite element analysis of flow and coupled heat
transfer in polymeric fluids | 851 |
| 5. | J.M.M.TOO and R.K.R.TRAFFORD
A finite element method for the analysis of coupled
interface problems | 860 |

SECTION 8

ELECTRO MAGNETIC COUPLINGS

- | | | |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 1. | P.M.BAUER, H.J.BOHM, F.HOISLBAUER, Ch.JAQUEMAR and
H.BARTOSCH
A study of electromagnetically and thermally
driven liquid metal in a duct | 875 |
| 2. | C.EMSON and P.BETTESS
Application of infinite elements to external
electromagnetic field problems | 887 |
| 3. | K.Y.YUAN, F.C.MOON and J.F.ABEL
Finite element analysis of coupled magnetomechanical
problems of conducting plates | 903 |
| 4. | J.SIKORA
Periodicity condition in nonlinear analysis of
electromagnetic field | 914 |

- | | | |
|----|------------------------------------------------------------------------------------------------------------------------|-----|
| 5. | P.ZIMNY | 922 |
| | Application of integral equations to two- and three-dimensional problems in the quasi-stationary electromagnetic field | |

SECTION 9

COUPLING AND MIXING IN FLUID FLOW

- | | | |
|----|-------------------------------------------------------------------------------------------------------------------------------|------|
| 1. | J.ADAMSON and J.N.LILLINGTON | 935 |
| | Turbulence modelling in multichannel geometry by correlation of data obtained from a fine scale single channel representation | |
| 2. | M.M.M.ABOU-ELLAIL | 948 |
| | Turbulent mixing of multiple rectangular jets | |
| 3. | S.S.KOUSSA | 958 |
| | Computer modelling of particle-laden free turbulent jets | |
| 4. | J.JAFFRE | 968 |
| | Mixed finite elements for the water flooding problem | |
| 5. | P.F.KOMAN and A.K.CHESTERS | 977 |
| | A spectral method for multiphase stratified flow stability problems | |
| 6. | J.A.LAITONE | 991 |
| | Numerical solution of multi-phase recirculating flow | |
| 7. | G.S.STELLING | 1005 |
| | Coupling 1-D and 2-D horizontal flow models | |
| 8. | P.BONTOUX, P.BONDET DE LA BERNARDIE and B.ROUX | 1018 |
| | Spectral methods for natural convection problems | |
| 9. | Y.ALLOUARD and J.C.BENAZETH | 1031 |
| | Splitting in cheaper problems and adjusting by optimal control for a Laplace equation | |

