UNIVERSIDAD NACIONAL DE
FACULTAD DE ING
CENTRO DE MEC
BIBLIOTEC
3446

CONTENTS

Section 1: Simulation of Physiological Processes

Hemodynamic aspects of rate-responsive pacing - a simulation study 3
A. Urbaszek, M. Schaldach

Modelling and simulation of the human arterial tree - a combined lumped parameter and transmission line element approach 11
M. Karlsson

The active force of the myocardium 19
R.M. Shoucri

Evaluation of intraventricular pressure gradients during systole: a numerical study 27
A. Redaelli, F. Inzoli, R. Pietrabissa, F.M. Montevecchi

The development of 3D simulation models to represent tumour growth 35
C. Blackburn, L. Dunckley

Membrane shear elasticity and stability of spiculated red cells 43
A. Iglič

A 3D torque-coding neural model of the orbital tissues and three 1D tension-coding neural models of the agonist/antagonist pairs of extraocular muscles are needed to adaptively control the motion of the eyes 51
P. Inchingolo

Mathematical model for shear-induced cytosolic calcium oscillations: the role of (ca2+)i in cytoskeleton organisations 59
J.K. Chang, J. Kim, B.G. Min, D.C. Han

Simulation of the dynamics of neuron degeneration in motor neuron disease 67
H.-G. Lipinski, G. Küther

Self-sustaining spiral wave activity in a two-dimensional ionic model of a cardiac ventricular muscle 75
J. Beaumont, N. Davidenko, J. Davidenko, J. Jalife

A non-linear simulator of the human respiratory chemostat 87
L. Chiari, G. Avanzolini, G. Gnudi, F. Grandi

The effect of body size on the computer simulation of human thermoregulation 99
M.S. Neale, C.E. Millard, W.R. Withey, K.C. Parsons

The first stages of ovarian follicle development: a mechanical model 107
A.-C. Roudot

Numerical simulation of the short-term heart regulation 115
S. Calvacanti, E. Belardinelli, S. Severi

Modelling of vascular trees in computer simulation studies of the coronary arterial system 123
W. Schreiner, F. Neumann, M. Neumann

Prediction of human arterial pulse wave shape changes in aging and hypertension 131
S.Urquiza, H. Desimone, M. Goñi, A. Introzzi, F. Clara

A mathematical model of the interaction between arterial and cardiopulmonary baroreceptors during acute cardiovascular stress 139
M. Ursino

The third-order action potential model for computer simulation of electrical wave propagation in cardiac tissue 147
B.Y. Kogan, W.J. Karplus, M.G. Karpoukhin

Model clamp: a new method to study electrical interactions between cardiac cells 155
R. Wilders, E.E. Verheijck, R. Kumar

An inverse transmission line model of the lower limb arterial system 163
L.R. John, W.L. Capper

Section 2: Computational Fluid Dynamics in Biomedicine

A problem oriented approach to the numerical modelling of haemodynamic problems 173
X.Y. Xu, M.W. Collins

Dynamics of mechanical heart valve prostheses 183
G. Belforte, T. Raperelli, G. Eula

Indirect instantaneous velocity profiles and wall shear rate measurements in arteries: a centre line velocity method applied to non newtonian fluids 191
P. Flaud, A. Bensalah

Secondary flows in the total cavopulmonary connection 201
G. Dubini, R. Pietrabissa, F.M. Montevecchi, F. Migliavacca

Flow competition in the bidirectional cavopulmonary anastomosis 209
F. Migliavacca, M.R. de Leval, G. Dubini, R. Pietrabissa, F.M. Montevecchi

Device induced thrombus formation in lower limb aneurysm 217
F. Inzoli, R. Pietrabissa, A. Saccani, U. Ugolotti

Modelling surface mediated enzymatic reactions in a flow system 225
R.D. Gentry, L. Ye

Lumped parameter modelling of diastolic function 233
P. Verdonck, P. Segers, R. Verhoeven, D. de Wachter

Biomedical application of the supercomputer: targeted delivery of inhaled pharmaceuticals in diseased lungs 241
T.B. Martonen, I. Katz, D. Hwang, Y. Yang

Outfow conditions in human arterial flow 249
M. Olufson, J. Ottesen

Doppler waveforms of the human fetal cardiovascular system: a mathematical model 257
G. Pennati, M. Bellotti

Section 3: Orthopaedics/Bone Mechanics

Review and overview of net bone remodeling 267
R.T. Hart

Lattice continuum as computational model of bone with microstructure: mechanical characteristics and structural parameters 277
T. Adachi, M. Tanaka, Y. Tomita

External osteosynthesis with new generation exteranal fixators: focus on innovative construction and simulation computer techniques 285
J. Deszczyński, W. Choromański, J. Karpiński

FEM Analysis of bone-implant system by using videodensitometric measurements 301
C. Bignardi, P.M. Calderale, F. Giacosa, O. Ieropoli

Finite element analysis of the human tibia 309
B.V. Mehta, S. Rajani

A three-dimensional model for stress distribution in the hip joint articular surface 317
M. Ipavec, A. Iglič, V. Kralj-Iglič, V. Antolič

Modelling the contact between muscles and bony structures during dynamic head-neck flexion 325
R.C. Anderson, R.H. Wahl, R.T. Hart, S.J. Guccione, Jr

Mechanical evaluation of spondylolysis by FEM 333
E. Tanaka, K. Imaki, M. Momondori, S. Murakami, H. Inoue, K. Ohmori

Computational simulation of idealized long bone re-alignment 341
R.T. Hart, A.M. Rust-Dawicki

Identification of pressure distribution at socket interface of above-knee prosthesis 351
M. Tanaka, Y. Akazawa, A. Nakagawa, I. Kitayama

Parallel implementation of a two-dimensional kinematic technique to diagnose back pain problems 361
C. Simonis, R. Allen, R. Cloke

Computer simulation of ideopathic scoliosis initiated by local asymmetric growth force in a vertebral body 369
S. Tadano, M. Kanayama, T. Ukai

Biomechanical analysis of the human mandible in surgical operations 377
N. Inou, K. Maki, S. Motojima, M. Koseki, S. Ujihashi

Shoe/insole design by simulating the in-shoe pressure distribution during walking 385
N. Praxmarer, F.G. Rammerstorfer, K. Irsigler, T. Kästenbauer

A method for the calculation of knee ligament loads during rehabilitation following injury or reconstruction 393
D.E. Toutoungi, R. Giampaoli, A. Leardini, F. Catani, J.J. O'Connor

Combining optimization and smoothing techniques in human motion analysis 401
P.F. La Palombara, A. Cappello, A. Leardini

Analytical study on the kinematic and dynamic behaviours of the tibiofemoral joint 409
H.Q. Guo, Z.K. Ling, E. Lumsdaine

Section 4: Electro-Magnetic Simulation

Solving the inverse problem of electrocardiology using body surface Laplacian mapping 419
P.R. Johnston

A simple algorithm for accurate computerized beat detection of noisy electromagnatic flow signals 427
J.-P. Montani, H.L. Mizelle, R.L. Summers, T.H. Adair

Coupling numerical solution of bio-heat transfer equation and Maxwell's equations in biological tissues during hyperthermia 435
S.-C. Hwang, D. Lemmonier

Section 5: Imaging Processing

Using of MRI in the production of 3-D computer models of bones 445
F. Nabhani, R. Sotudeh, A.N. Hart, D.S. Muckle, R.J. Minns

Study on maximum entropy image restoration of limited angle diffraction tomography 453
K. Hamamoto, T. Shiina, T. Nishimura, M. Saito

Automatic analysis of bone remodelling by means of "image processing" applied to radiographs 461
A.L. Audenino, P.M. Calderale, E.M. Zanetti

Automatic recognition of certebral landmarks using videofluoroscopic images: an alternative for spine kinematics 469
P. Bifulco, R. Allen, A. Della Fera, A. De Stefano, R. Magliulo, A.C. Breen

Bidimensional eye position measurement using video-oculographic systems: close form solution and error analysis 475
F. Fioravanti, P. Bruno, P. Inchingolo

Human femoral bone analysis 487
Z.-Q. Lui, T. Austin, C.D.L. Thomas, J.G. Clement

Section 6: Data Acquisition and Analysis

New modalities for monitoring fetal well-being during labour 497
E.S.G. Genevier, A.C. Deans, P.J. Steer

An optimal high-pass filtering technique to improve the detectability of evoked otoacoustic emissions 505
G. Tognola, P. Ravazzani, F. Grandori

Clustering algorithms as classifiers of blood pressure recordings 513
L.I. Passoni, J. Fritschy, A. Introzzi, F. Clara

A statistical approach to curve-fitting exploitation of biomedical waveforms 521
A. N. Kastania, M.P. Bekakos

ARMAX modelling of a mass spectrometer 531
B. Bouferrache, A. Rachid, J.P. Libert

Relation between singular values and graph dimensions of deterministic epileptiform EEG signals 539
V. Cabukovski, N. de M. Rudolph, N. Mahmood

Section 7: Design and Simulation of Artificial Organs and Non-Conventional Therapy

Design of new trileaflet heart valves: computational mechanics study 549
S. Mantero, E. Di Martino, R. Sesana, R. Pietrabissa

Effect of endotracheal tube leak on estimates of lung mechanics in ventilated infants: a computer simulation study 557
M.J. Turner

Computer simulation of heart-lung bypass 565
F. Boschetti

A transcutaneous energy transmission for a novel rechargeable cardiac pacemaker 573
T.H. Nishimura, T. Eguchi, K. Hirachi, Y. Maejima, M. Saito

Dynamics of implants for the human middle ear 579
A. Eiber, A. Kauf

Energetics of the heart model with the ventricular assist device 587
C. Chung, S.W.Lee, D.C. Han, B.G. Min

Mathematical modelling of the burn patient metabolism I: the glucose in the post-burn shock stage 595
L. Roa, T. Gómez-Cía, J.I. Ortega-Martínez

Computer aided interactive design/analysis of mechanical bi-leaflet heart valves 605
T. David, C.-H. Hsu

Heat transfer analysis of hyperthermia treatment of the prostate 617
D. Loyd, M. Karlsson, B.-J. Erlandsson, J.-G. Sjödin, P. Ask

Computer simulation of urea and electrolytes kinetics during hemodialysis 625
F. Grandi, G. Avanzolini, A. Cappello, L. Chiari

The use of perfluorochemical liquid as an alternative method to traditional mechanical ventilation 633
M.L. Constantino

Calculation of steady and unsteady shear levels in hemodialysis 641
D. De Wachter, R. Verhoeven, P. Verdonck

Authors' Index 649

BIBLIOTECA