

CONTENTS

Preface ..... IX

Contributors List ..... XI

**Special Contribution on Magnetic Fluids**

Thermal diffusion and particle separation in ferrocolloids  
*E. Blums and A. Mezulis..... 1*

**I - MHD Flows and Turbulence**

Geodynamo and MHD  
*D. Jault, Ph. Cardin and H.C. Nataf.....17*

Velocity profile optimization for the Riga dynamo experiment  
*F. Stefani, G. Gerbeth and A. Gailitis ..... 31*

Magnetohydrodynamic flows around bodies in strong transverse magnetic fields  
*S. Molokov and K. Rajan.....45*

On MHD turbulence models for simulation of magnetic brakes in continuous steel casting processes  
*O. Widlund, S. Zahrai and F. Bark .....61*

Absolute and convective MHD stability of a capillary liquid metal jet with azimuthal velocity  
*K. Loueslati and J.P. Brancher .....77*

Quasi-two-dimensional turbulence in MHD shear flows: the MATUR experiment and simulations  
*Y. Delannoy, B. Pascal, T. Alboussiere, V. Uspenski and R. Moreau.....93*

Transport of momentum and heat in oscillatory MHD flow  
*S. Cuevas and E. Ramos.....107*

Roads to turbulence for an internal MHD buoyancy-driven flow due to a horizontal temperature gradient  
*L. Davoust, R. Moreau and R. Bolcato .....123*

**II - Electrochemical Problems with or without Magnetic Fields**

A model of the anode from the chlorate cell  
*P. Byrne, D. Simonsson, E. Fontes and D. Lucor.....137*

Sodium chlorate electrosynthesis cell under natural convection: simulation of the transient and steady state working behaviour  
*P. Ozil, M. Aurousseau and S. Mitu .....153*

MHD and micro-MHD effects in electrochemical systems  
*R. Aogaki, A. Tadano and K. Shinohara.....169*

Analysis of MHD effects on electrochemical processes: experimental and theoretical approach of the interfacial phenomena  
*J.P. Chopart, O. Devos . O. Aaboubi, E. Merienne and A. Olivier .....181*

Enhancement of electrolytic mass transfer around cylinders by exposure to switching magnetic fields  
*S. Mori, M. Kumita and M. Takeuchi* .....199

Laminar developing mass transfer in annulus with power law-fluids  
*O. Ould-Dris, A. Salem, J. Legrand and C. Nouar* .....213

Study of near wall hydrodynamics and mass transfer under magnetic field influence  
*S. Martemianov and A. Sviridov*.....229

Motions and mass transfer in a mercury coreless induction furnace  
*Y. Fautrelle, F. Debray and J. Etay*.....241

Sea Water MHD: Electrolysis and gas production in flow  
*P. Boissonneau and J.P. Thibault* .....251

**III - MHD in Metallurgy and Crystal Growth**

Thermoelectric magnetohydrodynamic effects during Bridgman semiconductor crystal growth with a uniform axial magnetic field: large Hartmann-number asymptotic solution  
*Y. Khine and J. Walker*.....269

Experimental and numerical analysis of the influence of a rotating magnetic field on convection in Rayleigh-Bénard configurations  
*B. Fischer, J. Friedrich, C. Kupfer, G. Müller and D. Vizman* .....279

Numerical solutions of moving boundary problem with thermal convection in the melt and magnetic field during directional solidification  
*M. El Ganaoui, P. Bontoux and D. Morvan* .....295

Effect of a steady magnetic field and imposed rotation of vessel on heat and mass transfer in swirling recirculating flows  
*I. Grants and Y. Gelfgat* .....311

On the stability of rotating MHD flows  
*Ph. Marty, L. Martin Witkowski, P. Trombetta, T. Tomasino and J.P. Garandet* .....327

Dynamics of an axisymmetric electromagnetic ‘crucible’ melting  
*V. Bojarevics, K. Pericleous and M. Cross* .....345

Measurement of solute diffusivity in electrically conducting liquids  
*T. Alboussièrre, J.P. Garandet, P. Lehmann and R. Moreau* .....359

Magnetic control of convection in liquid metal heated from above  
*O. Andreev, Yu. Kolesnikov and A. Thess* .....373

**IV - Energetic Applications**

Channel design influence on stability and working characteristics of induction MHD pump  
*J. Valdmantis, I. Bucenieks and Y. Cho*.....383

Contrast structures and rotating stall in MHD flows  
*Y. Polovko, E. Romanova and E. Tropp* .....395

Nonequilibrium plasma MHD power generation with FUJI-1 blow-down facility  
*Y. Okuno, T. Okamura, K. Yoshikawa, T. Suekane, K. Tsuji, T. Maeda, T. Murakami, S. Kabashima, H. Yamasaki, S. Shioda and Y.Hasegawa* .....409

*Index* .....421