

# Magnetohydrodynamics 57, 1 (2021)

## GENERAL AND THEORETICAL PROBLEMS

- [Jie Mao](#), [Mingliang Jin](#) and [Chao Xu](#). Numerical simulation of magnetohydrodynamic laminar flow in an electrically conducting circular pipe with V-shaped strips 3

## APPLIED PROBLEMS

- [Xiaoqiang Chen](#), [Hualin Ye](#), [Lingzhi Zhao](#), [Aiwu Peng](#) and [Weng Wang](#). Thrust distribution characteristics and structural strength analysis of the MHD propeller with a helical channel 17
- [E. Vinter](#), [V. Timofeev](#), [M. Pervukhin](#) and [N. Sergeev](#). Numerical simulation of electromagnetic refining by in-melt conduction excitation 27

Selected papers of the conference ``ACTUAL PROBLEMS OF ELECTROTECHNOLOGY (APET-2020)'', Yekaterinburg, Russia, October 1--2, 2020

### Preface

The Scientific School of Applied Magnetohydrodynamics in Sverdlovsk (now Yekaterinburg), Russia, has a long history, comparable to the history of the Magnetohydrodynamics Journal. M.G. Rezin, a professor of the Ural Polytechnic Institute (UPI) published his article ``Advances in Electromagnetic Stirring of Liquid Metals'' in 1965 just in the second issue of the Magnetohydrodynamics Journal. After that, the institute began to intensively develop the scientific field of magnetohydrodynamic (MHD) machines for different metallurgical applications. In the 2000s, the first conferences "Actual Problems of Electrotechnologies" were held in Yekaterinburg with the participation of scientists from the Czech Republic, Poland and Germany. One of the main problems discussed there were the problems of applied magnetohydrodynamics in metallurgy. These issues were considered mainly from the point of view of thermal and electromechanical effects on liquid metals. The Actual Problems of Electrotechnology (APET-2020) conference was held online and has become a new important step towards confirming the high international level of research in this field. During the APET-2020 conference, important problems of electromagnetic stirring, transport and separation of liquid metal were discussed. The special issue dedicated to the APET-2020 conference presents papers selected among APET-2020 presentations. We would like to thank the Ural Power Engineering Institute and all the reviewers who took part in the preparation of this special issue. E. Shvydkiy F. Sarapulov K. Bolotin Guest Editors

- [V. Eltishchev](#), [G. Losev](#) and [I. Kolesnichenko](#). Oscillations of free surface of rotating liquid metal in a cylindrical cell 41
- [M. Yu. Khatsayuk](#). Magnetohydrodynamic stirring for aluminium alloy production 51
- [G. Losev](#), [A. Mamykin](#) and [I. Kolesnichenko](#). Model of electromagnetic purification of liquid metal 73

<a href="#">G. Losev</a> , <a href="#">A. Mamykin</a> , <a href="#">V. Eltishchev</a> and <a href="#">I. Sokolov</a> . Adaptation of linear induction machine power supply to the tasks of liquid metal transportation and stirring	85
<a href="#">I. Sokolov</a> , <a href="#">E. Shvydkiy</a> , <a href="#">G. Losev</a> , <a href="#">S. Bychkov</a> and <a href="#">V. Frizen</a> . Numerical study of TMF inductor phase shift influence on liquid metal flow in a rectangular cell	95
<a href="#">I. Smolianov</a> , <a href="#">E. Shmakov</a> and <a href="#">J. Vencels</a> . Numerical analysis of liquid flows exposed to travelling magnetic field. 1. Idealized numerical experiment	105
<a href="#">I. Smolianov</a> , <a href="#">E. Shmakov</a> and <a href="#">J. Vencels</a> . Numerical analysis of liquid flows exposed to travelling magnetic field. 2. MHD instabilities due to magnetic end effects	121