

CONTENTS

<i>Introduction</i>	10
<i>Makhnenko V. I.</i> Advances in mathematical modelling and information technologies for welding and related technologies	11
<i>Asnis A. E., Demchenko V. F., Lesnoj A. B., Zabolotin S. P.</i> Computer modelling of hydrodynamics and heat transfer in growing of silicon single crystal by the floating-zone electron beam melting method	24
<i>Belyavin K. E., Petrushina M. V., Pogudo E. L., Chivel Yu. A.</i> Modelling of laser welding of charges of spherical metal powders	28
<i>Bokota A., Piekarska W.</i> Stressed state in joints made by laser welding with preheating	32
<i>Bolshakov M. V., Lukina G. N.</i> Mathematical model of diffusion bonding of porous metals	38
<i>Borisov Yu. S., Zatserkovny A. S., Krivtsun I. V.</i> Numerical analysis of processes of heat exchange between arc plasma and finely dispersed metal particles	43
<i>Velikoivanenko E. A., Rozyinka G. F., Pivtorak N. I.</i> Calculation algorithm for estimation of permissible sizes of lack of penetration in welded joints operating under complex range of cyclic loads	50
<i>Velikoivanenko E. A., Rozyinka G. F., Pivtorak N. I., Shekera V. M.</i> Numerical study of kinetics of stresses in butt welding of rails made from dissimilar materials	56
<i>Goloborodko Zh. G., Kvasnitsky V. V., Matvienko M. V., Solonichenko Yu. V., Serbin S. I., Kvasnitsky V. F.</i> Modelling of composition of gas atmosphere in plasma cutting of ship hull steels and its effect on the welding quality	66
<i>Demchenko V. F., Lesnoj A. B.</i> Numerical modelling of heat and mass transfer and hydrodynamics in electron beam remelting of titanium alloys	71
<i>Dzyuba V. L., Korsunov K. A.</i> Mathematical modelling of non-stationary arc in plasmatron channel	77
<i>Dilthey U., Mokrov O., Pavlyk V.</i> Modelling and simulation of multi-pass GMA welding of carbon steel with preheating	83
<i>Diachenko V. I., Medvedev S. V., Chizh O. P.</i> Supercomputer-aided structural-technological design of welded structures	89
<i>Zankovets P. V., Sheleg V. K.</i> Mathematical modelling of the effect of production factors on formation of defects in welded joints	95
<i>Zdor G. N., Ivanov G. A., Zankovets P. V.</i> Computer systems for technological preparation of fabrication of welded structures	99
<i>Semmler U., Alaluss K., Matthes K.-J.</i> FE-modelling of the thermometallurgy and stress-distortion behaviour during PTA hardfacing	103
<i>Kashirsky Yu. V., Zubchenko A. S.</i> Information bank on structural materials and welding consumables	109
<i>Kvasnitsky V. V., Buryakov A. V.</i> Mathematical modelling of chemical composition of weld metal in submerged-arc welding	115
<i>Kvasnitsky V. F., Ermolaev G. V., Labartkava A. V.</i> Investigation of the effect of shape of a brazed joint in dissimilar materials on natural stress fields by the computer modelling method	119
<i>Kvasnitsky V. V., Matvienko M. V., Kvasnitskaya Yu. G.</i> Effect of selective evaporation on chemical composition of metal in electron beam technologies	123
<i>Korolyova T. V.</i> Development of the ArcWeldSys system in terms of mathematical modelling and information filling	127

<i>Kostin V. A.</i> Analytical description of the process of formation of acicular ferrite in the low-carbon low-alloy steel weld metal	134
<i>Kostina L. V.</i> Computer-aided system for design of technological processes and regulation of blanking operations used in welding fabrication	137
<i>Kunkevich D. P., Medvedev S. V.</i> Computer technologies for design of assembly-welding fixture: current status, problems and prospects	140
<i>Lebedev Yu. M.</i> Algorithms of calculation of weldability conditions for low-alloy hardenable steels depending upon their composition and initial structure	145
<i>Lebedev Yu. M., Martynenko V. A.</i> Peculiarities of surface hardening of cylindrical carbon and low-alloy steel parts using non-consumable electrode arc	151
<i>Lesnoj A. B., Kasatkin O. G., Zamkov V. N.</i> Information system on welding of titanium and titanium alloys	157
<i>Maksimov S. Yu., Gurzhy A. A.</i> Effect of underwater welding conditions on initiation pores in weld metal	161
<i>Margolin B. Z., Varovin A. Ya., Kostilyov V. I.</i> Determination of residual welding stresses in water-moderated reactor bodies after multi-pass welding, surfacing and high-temperature tempering	167
<i>Markashova L. I., Arsenyuk V. V., Grigorenko G. M., Berdnikova E. N., Alekseenko T. A.</i> Structural approach to evaluation of mechanical properties of HAZ of joints in steels and alloys	174
<i>Makhnenko V. I., Velikoivanenko E. A., Kravtsov V. T.</i> Numerical method for evaluation of residual stresses and microstructural components in welding of propeller shafts of medium-tonnage sea ships	180
<i>Makhnenko V. I., Saprykina G. Yu.</i> Discontinuous solidification of weld metal	185
<i>Makhnenko O. V.</i> Increasing efficiency of thermal straightening of thin-sheet welded structures on the basis of mathematical modelling	189
<i>Nezhivlyak A. E., Grechneva M. V., Balanovsky A. E., Aksyonov Yu. N.</i> Development of a rational design of span bolsters based on the finite elements analysis results	195
<i>Nesterenko N. P., Senchenkov I. K.</i> Modelling of vibration heating of reinforced polymeric films in ultrasonic welding with normal feed of vibrations	200
<i>Ohji T., Miyasaka F., Yamamoto T., Tsuji Y.</i> Mathematical model for MAG welding in a manufacturing environment	205
<i>Palamarchuk B. I., Pashchin N. A., Malakhov A. T., Cherkashin A. V., Manchenko A. N., Chajka A. A.</i> Modelling of parameters of the shock-wave process in local pulsed treatment of plane samples using ring charges	210
<i>Palotas B.</i> Mathematical modelling of welding phenomena	215
<i>Piekarska W.</i> Phase transformations in HAZ metal of welded joints made by laser welding with preheating	220
<i>Petrushina M. V., Nikolajchuk V. V.</i> Modelling of shrinkage forces and moving heat sources for prediction of residual welding strains	225
<i>Pokhodnya I. K., Shvachko V. I., Bernatsky S. V.</i> Effect of polymorphic $\gamma \rightarrow \alpha$ transformation on distribution of hydrogen in weld	230
<i>Prokopenko G., Kudryavtsev Y., Knysh V.</i> Ultrasonic peening of welded elements and software for its optimum application	233
<i>Senchenkov I. K., Tabieva G. A., Ryabtsev I. A., Turyk E.</i> Numerical modelling of residual stresses and strains in multi-layer cladding of cylindrical parts	237
<i>Skosnyagin Yu. A., Lesnoj A. B.</i> Information storage and retrieval system «Electrodes for manual arc welding»	242
<i>Shably O. N., Pulka Ch. V., Pismenny A. S.</i> Mathematical modelling of cooling of a disk after induction cladding in a heating system	245
<i>Shvachko V. I., Ignatenko A. V.</i> Numerical estimation of the amount of hydrogen transferred by edge dislocation	248
<i>Index</i>	255