

*The National Academy of Sciences of Ukraine
E.O. Paton Electric Welding Institute
International Association «Welding»*



***8th International Conference
«MATHEMATICAL MODELING AND INFORMATION TECHNOLOGIES
IN WELDING AND RELATED PROCESSES»***

Conference program



***Ukraine, Odessa
Hotel «Kurortniy»
19-23 September, 2016***

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**The Paton
WELDING JOURNAL**

Conference program

September 19, Monday

09:00-18:00 Arrival, registration, accommodation of the Conference participants
19:00-21:00 Welcome reception

September 20, Tuesday

09:30-11:10 Plenary papers
11:10-11:25 Coffee break
11:25-13:00 Plenary papers
13:00-14:30 Lunch
14:30-16:10 Plenary papers
16:10-16:25 Coffee break
16:25-17:40 Plenary papers

September 21, Wednesday

09:30-11:10 Plenary papers
11:10-11:25 Coffee break
11:25-13:00 Plenary papers
13:00-14:30 Lunch
14:30-16:10 Plenary papers
16:10-16:25 Coffee break
16:25-17:40 Plenary papers

September 22, Thursday

09:30-11:10 Plenary papers
11:10-11:25 Coffee break
11:25-13:00 Plenary papers
13:00-14:30 Lunch
14:30-15:45 Plenary papers
19:00-21:00 Banquet

September 23, Friday

09:00-11:00 Round table

«Role of power factors in formation of welding arc and its penetration capability»,
moderators - Prof. I.V. Krivtsun and Prof. V.F. Demchenko

*«Commercialization of academic innovations
(an example is Ariel university, Israel)»*,
Prof. M. Zinigrad, Ariel university, Israel

Speech duration is 25 minutes (20 minutes for presentation and 5 minutes for discussion)
Working languages of the Conference: Ukrainian, Russian, English. Simultaneous translation is provided.

September 20, Tuesday

Chairman – V.F. Demchenko

- 09:30-09:55 Opening of the Conference
Scientific heritage of V.I. Makhnenko, academician of the NAS of Ukraine
Milenin A.S., Demchenko V.F.
E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine
- 09:55-10:20 Mathematical Modeling of High Temperature Metallurgical Processes
Zinigrad Michael
Ariel University, Israel
- 10:20-10:45 Numerical analysis of characteristics of plasma of constricted and free-burning arc with refractory cathode
Krivtsun I.V.¹, Krikent I.V.², Demchenko V.F.¹
¹E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine;
²Dneprodzerzhinsk State Technical University, Ukraine
- 10:45-11:25 Power interaction of arc current with own magnetic field in non-consumable electrode welding
Demchenko V.F.¹, Krivtsun I.V.¹, Krikent I.V.², Abdulakh V.M.¹
¹E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine;
²Dneprodzerzhinsk State Technical University, Ukraine
- 11:10-11:25 Coffee break
- 11:25-11:50 Determination of residual technological stresses in zone of shell to vessel circumferential joints of WWER-1000 reactor
Makhnenko O.V., Velikoivanenko E.A., Pivtorak N.I., Savitskaya E.M., Saprykina G.Yu.
E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine
- 11:50-12:15 Modelling of frequency characteristics of impedance of biological tissues based on Fricke equivalent circuit
Pentegov I.V., Sydorets V.N., Rymar S.V., Krivtsun I.V.
E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine
- 12:15-12:40 Information technology and mathematical tools in development of thermo-surgical equipment
Khudetskii I.Yu.^{1,2}, Krivtsun I.V.^{1,2}, Maksimenko V.B.¹, Antonova-Rafi Yu.V.¹
¹NTUU «KPI», Kyiv, Ukraine
²E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine
- 12:40-13:00 Normative-ipsative approach for modelling of medical-biological processes in development of thermal-surgical equipment
Khudetskii I.Yu.^{1,2}, Krivtsun I.V.^{1,2}, Maksimenko V.B.¹, Antonova-Rafi Yu.V.¹
¹NTUU «KPI», Kyiv, Ukraine
²E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine
- 13:00-14:30 Lunch

Chairman – I. V. Krivtsun

- 14:30-14:55 Mathematical modelling of thermo-mechanical processes in multi-layer surfacing of flat and cylindrical parts
Senchenkov I.K.¹, Ryabtsev I.A.², Chervinko O.P.¹, Babinets A.A.²
¹S.P. Timoshenko Institute of Mechanics, Kyiv, Ukraine;
²E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine
- 14:55-15:20 Numerical prediction of processes of nucleation and propagations of subcritical damage of metal of welded pipeline critical elements at static and fatigue loads
Milenin A.S., Velikoivanenko E.A., Rozyinka G.F., Pivtorak N.I.
E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine

- 15:20-15:45 Influence of focused CO₂-laser radiation on characteristics of argon arc plasma inside a plasmatron nozzle channel
Ignatov A.V.¹, Krivtsun I.V.¹, Semenov I.L.²
¹E.O. Paton Electric Welding Institute of NASU, Kyiv, Ukraine;
²German Aerospace Center (DLR), Munich, Germany
- 15:45-16:10 Computer modelling of ESR peculiarities of up to 300 t ingots in six electrode bifilar furnace
Volchenkov E.A.¹, Stovpchenko A.P.², Medovar L.B.¹, Jong Li³, Young Chu³
¹E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine;
²«Elmet-Rol», Kyiv, Ukraine;
³Yantai Taihai Manoir Nuclear Equipment (THM), China
- 16:10-16:25 Coffee break
- 16:25-16:50 Structure and service properties of welded joints of metals and alloys
Markashova L.I., Berdnikova E.N., Alekseenko T.A., Kushnareva O.S., Polovetskii E.V.
 E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine
- 16:50-17:15 Peculiarities of formation of input data for calculation of radiation swelling of welded structures of WWER-1000 internals
Kandala S.M.¹, Mirzov I.V.²
¹E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine;
²Nuclear Research Institute, Rez, Check Republic
- 17:15-17:40 Modelling of distribution of electro-magnetic field in weld pool taking into account eddy-currents
Prilipko E.A.¹, Maksimov S.Yu.¹, Rybalkin E.A.²
¹E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine;
²Pukhov Institute for modelling in Energy Engineering of the NAS, Kyiv, Ukraine

September 21, Wednesday

Chairman – O.V. Makhnenko

- 09:30-09:55 Procedure for recovery of electric current density distribution in anode spot of arc with refractory cathode based on experimental data, received by split anode method
Krivtsun I.V.¹, Demchenko V.F.¹, Likhoshva A.V.¹, Sydorets V.N.¹, Kovalenko D.V.¹, Kovalenko I.V.¹, Pavlov A.G.¹, Wu Boyi²
¹E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine;
²Guangdong Institute of Welding (E.O. Paton Chinese-Ukrainian Welding Institute), Guangzhou, China
- 09:55-10:20 Numerical analysis of tendency to cold cracking in electron-beam welding of plates of different thickness from γ -titanium aluminide-based alloy
Milenin A.S., Velikoivanenko E.A., Rozynka G.F., Pivtorak N.I., Vrzhezhevskii E.L.
 E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine
- 10:20-10:45 Modelling the processes of metallic materials production using additive technology methods
Kostin V.A.
 E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine
- 10:45-11:10 Computer modelling of heat state of magnesium alloy parts at their friction stir processing
Dutka V.A.
 V.N. Bakul Institute for Superhard Materials, Kyiv, Ukraine
- 11:10-11:25 Coffee break

- 11:25-11:50 Features of Supercapacitor Model for Small Scale Resistance Welding Applications
Bondarenko O.¹, Sydorets V.², Bondarenko I.³, Stević Z.⁴
¹National Technical University of Ukraine «Kyiv Polytechnic Institute»;
²E.O. Paton Electric Welding Institute of the NAS of Ukraine;
³Donbas State Technical University;
⁴University of Belgrade, Serbia
- 11:50-12:15 Model of continuous casting of ingots of rail steels using combined CC machine + ESR process
Pedchenko E.A.¹, Polishko A.A.¹, Volchenkov E.A.¹, Lebed V.A.², Kayda P.N.²
¹E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine;
²«Elmet-Rol», Kyiv, Ukraine
- 12:15-12:40 Electromagnetic processes in power source for alternating current arc welding
Sydorets V.N.¹, Bondarenko Yu.V.², Bondarenko A.F.³, Shklovskii E.⁴
¹E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine;
²DonSTU, Lisichansk, Ukraine;
³NTUU «KPI», Kyiv, Ukraine;
⁴Tallinn Technical University, Tallinn, Estonia
- 12:40-13:00 Modelling of peculiarities of bottom casting of cylindrical ingots – consumable electrodes for electros slag remelting
Volchenkov E.A.¹, Kostetskii Yu.V.¹, Stovpchenko A.P.^{1,2}
¹E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine;
²«Elmet-Rol», Kyiv, Ukraine
- 13:00-14:30 Lunch

Chairman – V.N. Sydorets

- 14:30-14:55 Effect of welding current pulse modulation on characteristics of arc plasma and penetration capability of arc in TIG welding
Demchenko V.F.¹, Krivtsun I.V.¹, Krikent I.V.², Wu Boyi³, Kovalenko D.V.¹
¹E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine;
²Dneprodzerzhinsk State Technical University, Ukraine;
³Guangdong Institute of Welding (E.O. Paton Chinese-Ukrainian Welding Institute), Guangzhou, China
- 14:55-15:20 Modelling of temperature fields and stress-strain state of small 3D specimen at its layer-by-layer formation at EBMB equipment
Makhnenko O.V., Milenin A.S., Velikoivanenko E.A., Rozyinka G.F., Pivtorak N.I., Gavrilov D.S.
E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine
- 15:20-15:45 Effect of arc welding mode on phase composition of welded joints from high-strength titanium alloy of Ti-6,5Al-3Mo-2,5V-4Nb-1Cr-1Fe-2,5Zr system
Belous V.Yu., Kostin V.A., Grigorenko S.G., Selin R.V.
E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine
- 15:45-16:10 Mathematical modelling of residual stresses taking into account microstructural transformations in a zone of surfacing of nozzle zone of WWER-1000 reactor vessel
Makhnenko O.V., Kostenevich E.S.
E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine
- 16:10-16:25 Coffee break
- 16:25-16:50 Modelling of condensed particle movement in process of dusty plasma self-organization
Dragan G.S., Kolesnikov K.V.
Physics RI of Odessa I.I. Mechnikov National University, Ukraine

- 16:50-17:15 Modelling of arc surfacing of tube sheets of NPP steam generators by protective anti-corrosion layer
Wu Boyi
Guangdong Institute of Welding (E.O. Paton Chinese-Ukrainian Welding Institute), Guangzhou, China
- 17:15-17:40 Structure and properties of cermet coatings, produced by detonation plasma-arc spraying
Markashova L.I., Tyurin Yu.N., Kolisnichenko O.V., Berdnikova E.N., Kushnareva O.S., Titkov E.P.
E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine

September 22, Thursday

Chairman – V.A. Kostin

- 09:30-09:55 Interaction of focused CO₂-laser radiation with column and anode area plasma of constricted arc
Krivtsun I.V.¹, Krikent I.V.², Demchenko V.F.¹, Zabirov A.³
¹E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine;
²Dneprodzerzhinsk State Technical University, Ukraine;
³Welding and Joining Institute, Aachen University, Germany
- 09:55-10:20 Efficiency of laser and arc heat sources in hybrid laser-arc welding
Bushma A.I.¹, Sydorets V.N.¹, Wu Boyi², Bakradze N.³
¹E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine;
²Guangdong Institute of Welding (E.O. Paton Chinese-Ukrainian Welding Institute), Guangzhou, China;
³Georgian Technical University, Tbilisi, Georgia
- 10:20-10:45 Effect of dispersed refractory inoculants on parameters of weld metal primary structure in HSLA steels welding
Ermolenko D.Yu.
E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine
- 10:45-11:10 Prediction of SSS in a zone of circumferential joints of thick-walled pipelines from increased strength heat-resistant steel of martensite class
Makhnenko O.V., Velikoivanenko E.A., Rozynka G.F., Pivtorak N.I., Savitskaya E.M., Saprykina G.Yu.
E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine
- 11:10-11:25 Coffee break
- 11:25-11:50 Prediction of physical-chemical properties of ESR slags based on interatomic interaction model
Togobitskaya D.N.¹, Stovpchenko A.P.², Lisova L.A.², Stepanenko D.A.¹, Polishko A.A.²
¹Z.I. Nakrasov Institute of Ferrous Metallurgy of the NAS of Ukraine, Dnepr, Ukraine;
²E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine
- 11:50-12:15 Optimizing technological process of electroslag melting of steel cylindrical ingots based on results of mathematical modeling
Makhneko O.V., Milenin A.S., Kozlitina S.S., Polishko A.A., Dzhyubak L.I.
E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine
- 12:15-12:40 Numerical research of formation of large diameter ingots of electroslag remelting
Sibir A.V.¹, Medovar L.B.², Gubinskii M.V.¹
¹National Metallurgical Academy of Ukraine, Dnepr, Ukraine;
²E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine

- 12:40-13:00 Mathematical modelling of residual stresses and properties of material in nozzle zone of WWER-1000 reactor vessel
Makhnenko O.V., Velikoivanenko E.A., Rosynka G.F., Kostenevich E.S.
 E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine
- 13:00-14:30 Lunch

Chairman – A.T. Zelnichenko

- 14:30-14:55 Calculation prediction of stressed state in welding assembly zone of header to nozzle of PVG-1000 stem generator body
Makhnenko O.V., Muzhichenko A.F.
 E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine
- 14:55-15:20 Visualizing the mechanism of strengthening of magnesium atomic lattice in helium and zinc alloying
Khokhlova Yu.A., Khokhlov M.A.
 E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine
- 15:20-15:45 Modelling of heating processes in welding of soft live tissues
Manunenko S.I.¹, Senchurov S.P.¹, Lankin Yu.N.²
¹T.G. Shevchenko KNU, Kyiv, Ukraine;
²E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine

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Organizing Committee

E.O. Paton Electric Welding Institute of
 NASU,
 11, Kazimir Malevich Str., Kiev, 03680,
 Ukraine

Dr. Alexander Zelnichenko
 Tel./Fax: (38044) 200-82-77
 Mob.: (38097) 505-19-91
 E-mail: journal@paton.kiev.ua
 E-mail: patonpublishinghouse@gmail.com

Dr. Irina Romanova
 Tel.: (38044) 205-22-26
 Mob.: (38050) 520-01-67
 E-mail: romanova@paton.kiev.ua

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