

Volume II

CONTENTS

Engineering Sciences and Production Technology

Sibel Ahmedova SECURE CROSS-BORDER INNOVATION CLUSTERS IN INDUSTRY 4.0: A MODEL AND EMPIRICAL STUDY OF THE BURGAS–EDIRNE REGION	15-21
Krasimir Ambarev, Stiliyana Taneva, Valyo Nikolov STUDY OF THE INFLUENCE OF TIRE AIR PRESSURE ON NATURAL FREQUENCIES OF A MACPHERSON SUSPENSION	23-27
Iliya Chetrokov, Silviya Salapateva POSSIBILITIES FOR INCREASING THE ACCURACY OF ACTIVE CONTROL IN TURNING ON CNC MACHINE TOOLS THROUGH ADAPTIVE ACCURACY CONTROL	29-37
Siyka Demirova ARTIFICIAL INTELLIGENCE IN LOGISTICS: ADOPTION PATTERNS, PERFORMANCE EFFECTS, AND MARKET STRUCTURE	39-44
Siyka Demirova, Mihail Ivanov, Sibel Ahmedova INTELLIGENT PRODUCTION AND BUSINESS PROCESSES: APPLICATION IN THE MECHANICAL ENGINEERING ENTERPRISES OF NORTHEASTERN REGION, BULGARIA	45-49
Svetlana Dimitrakieva, Siyka Demirova, Dobromira Ivanova INTEGRATED MANAGEMENT OF MARKETING AND LOGISTICS RELATIONSHIPS WITH CUSTOMERS THROUGH DIGITAL TECHNOLOGIES IN THE INDUSTRIAL SECTOR	51-57
Margarita Dimitrova, Stoyan Tanev, Adelina Miteva REVIEW OF RECENT ADVANCES IN HIGH PERFORMANCE ALUMINIUM ALLOYS FOR AEROSPACE STRUCTURES	59-66
Desislava Dimova, Boyan Dochev, Teodor Solakov, Mikaela Dubaradziewa, Nikolay Ivanov SURFACE MODIFICATION OF STEEL 1.2343 (EN ISO 4957) BY ION NITRIDING	67-72
Boyan Dochev, Desislava Dimova, Filip Ublekov, Hristo Penchev, Nikola Tomanov, Yavor Boychev INVESTIGATION THE INFLUENCE OF MULTI-WALLED CARBON NANOTUBES AND AMORPHOUS CARBON ON THE MECHANICAL PROPERTIES OF THERMOSETTING POLYMERS	73-77
Kliment Georgiev, Misho Matsankov, Atanas Radulov, Mario Dechev, Teodor Demirev INVESTIGATION OF DIFFERENCES IN LIGHT TRANSMISSION IN TRANSLUCENT MATERIALS USED IN ADDITIVE MANUFACTURING	79-84

Kliment Georgiev, Iva Naydenova, Pavlina Katsarova METHODOLOGY FOR TESTING BEARINGS BY THE DAMPLING OSCILLATION METHOD	85-89
Kliment Georgiev METHODOLOGY FOR PERFORMING A MEASUREMENT SYSTEM ANALYSIS WITH FOUR OPERATORS	91-96
Mariya Georgieva, Petia Gencheva FROM CONVENTIONAL CAMOUFLAGE TEXTILES TO METAMATERIAL-BASED COMBAT PROTECTION: REVIEW	97-102
Lyuba Gyurova, Cvetelina Velkova HYDRODYNAMIC JET REACTION ANALYSIS FOR MARINE PROPULSION CONTROL UNITS	103-106
Lyuba Gyurova NUMERICAL MODELING OF CONJUGATE HEAT TRANSFER BETWEEN A FLUID AND A SOLID USING ANSYS FLUENT	107-111
Tzvetelin Gueorguiev, Hasan Hasanov, Petar Tsvyatkov ENGINEERING ASPECTS OF INNOVATION MANAGEMENT SYSTEMS	113-117
Hristo Hristov, Momchil Manov DETERMINATION OF OPTIMAL UNDERWATER CUTTING PARAMETERS FOR SHIP HULL STEEL OF SCIENTIFIC RESEARCH VESSEL RSV 421 "ST. ST. CYRIL AND METHODIUS"	119-123
Mihail Ivanov, Siyka Demirova, Sibel Ahmedova OPPORTUNITY TO INCREASE THE COMPETITIVENESS OF THE INDUSTRIAL ENTERPRISE AND TRANSITION TO INDUSTRY 4.0 THROUGH THE IMPLEMENTATION OF BUSINESS PROJECTS FROM THE EUROPEAN STRUCTURAL AND INVESTMENT FUNDS	125-129
Hristo Yakimov, Hristo Radev, Hasan Hasanov, Irina Aleksandrova ANALYSIS OF ACCURACY IN DIFFERENT POSITIONING SCHEMES USING STATISTICAL METHODS	131-137
Vanya Katsarska, Tarek Assassi COMPETENCY-FOCUSED AVIATION ENGLISH FOR AIRCRAFT MAINTENANCE	139-143
Evgeni Kehayov, Emil Yankov, Velko Rupetsov, Georgi Komitov MULTIFACTORIAL STUDY OF THE INFLUENCE OF AN ANAMEGATOR ON OIL ON THE CHANGE IN THE TRIBOTECHNICAL PARAMETERS OF THE FRICTION PAIR	145-150
Kiril Lengerov, Ivan Tashev IMPROVING THE ACCURACY OF GEAR TRANSMISSION BY DIVIDING THE KINEMATIC ERROR	151-154
Kiril Lengerov, Ivan Tashev OPTIMIZATION OF STATISTICAL ANALYSIS FOR GEAR INSPECTION	155-158
Kiril Lengerov, Desislava Petrova, Angel Lengerov, Ivan Mitev STUDY OF THE QUALITY IINDICATORS OF THE SURFACES OF GEAR BLANKETS AFTER COMBINED PROCESSING BY CUTTING AND SURFACE PLASTIC DEFORMATION	159-165

Kiril Lengerov, Georgi Komitov, Evgeni Kehayov, Ivan Mitkov COMPUTER VISION CAPABILITIES FOR ORTHOPHOTOGRAMMETRY AND 3D TERRAIN MODELING	167-171
Velichko Machev, Viktor Georgiev NON-DESTRUCTIVE EVALUATION OF ION-NITRIDED AND CARBONITRIDED LAYERS ON BH11 AND D2 TOOL STEELS: EDDY CURRENT TESTING AND BARKHAUSEN NOISE METHODS	173-176
Momchil Manov, Hristo Hristov INVESTIGATION AND IDENTIFICATION OF SHIP HULL STEEL GRADE FOR MAINTENANCE AND REPAIR PROCEDURES ON SCIENTIFIC RESEARCH VESSEL RSV 421 "ST. ST. CYRIL AND METHODIUS"	177-183
Marin Marinov SYNTHESIS IMPACT PROTECTION IMPLEMENTED IN A PARTICULAR FACILITY THROUGH FRICTION DAMPERS	185-188
Rumyana Milyovska, Petia Gencheva HYBRID PLASMA-SOL-GEL TECHNOLOGIES FOR FLAME RETARDANCY AND NIR CAMOUFLAGE OF MILITARY TEXTILES: REVIEW	189-196
Yuliyen Minchev, Ivaylo Minchev ON THE VIBRATIONS OF MULTI-CYLINDER MARINE DIESEL GENERATORS	197-202
Penko Mitev, Agop Izmirliyan, Atanasi Tashev, Yordan Stoyanov AUTOMATED LOADING AND UNLOADING OF CNC VERTICAL MILLING CENTERS	203-208
Neli Nikolova BENCHMARKING FOR INTEGRATION OF ARTIFICIAL INTELLIGENCE IN STRATEGIC FIRM MANAGEMENT	209-216
Yuliyen Petrov, Liliya Staneva ANALYSIS OF BRAKING DECELERATION AND THE EFFICIENCY OF AUTOMOTIVE BRAKING SYSTEMS USING MATLAB	217-221
Yuliyen Petrov, Liliya Staneva MATHEMATICAL MODELING OF SAFE VEHICLE–PEDESTRIAN DISTANCE WITH INTERACTIVE VISUALIZATION	223-227
Desislava Petrova, Ivan Mitev TURNING INNOVATION INTO A PRODUCT CONCEPT	229-234
Hristo Radev, Hristo Yakimov, Irina Aleksandrova INVESTIGATION AND MODELLING OF SURFACE ROUGHNESS DURING MILLING OF GJL-250 GRAY CAST IRON AND S235JR STEEL USING MIXED CERAMIC TOOLS	235-241
Silviya Salapateva, Radostina Mihova, Iliya Chetrokov MODELING AND OPTIMIZATION OF MATERIAL FLOWS IN A SECTION FOR MACHINING IN THE PRESENCE OF ALTERNATIVE TECHNOLOGICAL PROCESSES	243-250

Silviya Salapateva, Radostina Mihova, Iliya Chetrokov ALGORITHM FOR FINDING OPTIMAL PLACEMENT OF OBJECTS IN A MACHINING SECTION IN THE PRESENCE OF ALTERNATIVE TECHNOLOGICAL PROCESSES	251-257
Silviya Salapateva, Iliya Chetrokov INCREASING THE ACCURACY OF MACHINING BY MEANS OF COMPLEX PROCESS MANAGEMENT THROUGH ACTIVE AND ADAPTIVE CONTROL	259-264
Margaret Sivova, Nikolay Tranchev DIGITAL TRANSFORMATION OF THE BULGARIAN ROSE IN SUSTAINABLE FASHION DESIGN THROUGH SPECIALIZED MACHINE EMBROIDERY SOFTWARE	265-272
Margaret Sivova, Desislava Ivanova INTEGRATING BULGARIAN NATIONAL IDENTITY INTO SUSTAINABLE FASHION DESIGN THROUGH DIGITAL TECHNOLOGIES	273-278
Vladimirs Šatrevičs, Māris Asafrejs, Viktorija Skvarciany, Inga Eriņa DEVELOPMENT OF CROSS-CUTTING OPTIMIZING SCANNER FOR ASPEN AND BLACK ALDER BOARDS	279-284
Vladimirs Šatrevičs, Māris Asafrejs, Viktorija Skvarciany, Simona Survilaite COMMERCIALISATION POTENTIAL FOR SCANNERS IN WOOD PROCESSING. CROSS-CUTTING OPTIMIZING SCANNER FOR ASPEN AND BLACK ALDER	285-291
Vladimirs Šatrevičs, Gundars Kuļikovskis, Jēkabs Baumanis, Viktorija Skvarciany 3D AND LINE SCANNING CAMERA SYSTEM CONCEPT IN REAL-TIME WOOD PROCESSING	293-300
Vladimirs Šatrevičs, Gundars Kuļikovskis, Jēkabs Baumanis, Viktorija Skvarciany DEVELOPMENT OF A 3D AND LINE-SCANNING CAMERA FOR AUTOMATIC WOOD DEFECT MARKING	301-307
Ivan Tashev, Kiril Lengerov ANALYSIS OF OPTIMAL SHAPE OF CAM MECHANISM WITH ROLLER ROCKER	309-313
Ivan Tashev, Kiril Lengerov MODELLING OF ACTIVE VIBRATION ISOLATION SYSTEM FOR AIR COMPRESSOR	315-320
Desislava Teneva, Penka Stoeva, Ognyan Ognyanov, Alexey Stoev, Mina Spasova OBSERVATIONS OF THE EVOLUTION OF THE SOLAR DIAMETER AND SOLAR CONSTANT WITH CUBSAT 3U SATELLITES	321-325
Aleksandar Tsvetanov, Benislav Dimitrov, Desislava Petrova ARCHITECTURE OF AN AUTONOMOUS ELECTRIC GARBAGE TRUCK WITH AI MANAGEMENT	327-333
Cvetelina Velkova PITOT TUBE SIMULATION: A KEY TOOL FOR REAL ENGINEERING APPLICATIONS IN MARINE ENGINEERING AND MECHATRONICS	335-338
Beata Vlahova TENSILE STRENGTH OF COPPER ALLOYED STRUCTURAL POWDER STEELS	339-344

Beata Vlahova INFLUENCE OF STRENGTH CHARACTERISTICS ON THE TECHNOLOGICAL PARAMETERS OF THE BOROALUMINIZING PROCESS	345-349
Beata Vlahova WEAR RESISTANCE OF MEDIUM ALLOY TOOL STEELS AFTER SINGLE-COMPONENT SURFACE ENRICHMENT	351-355
Beata Vlahova MACHINABILITY OF SHORT ROTARY PARTS MADE OF IMPROVEABLE STEELS WITH ROBOTIC FEEDING	357-361
Tsanka Zlateva-Petkova, Daniela Toneva ANALYSIS OF SOFTWARE AND ORGANIZATIONAL SOLUTIONS FOR SUPPORTING INNOVATION MANAGEMENT IN INDUSTRIAL ENTERPRISES IN THE CONTEXT OF INDUSTRY 4.0	363-371
Tsanka Zlateva-Petkova, Daniela Toneva DEVELOPMENT OF A METHODOLOGICAL FRAMEWORK FOR INTEGRATING INTELLIGENT TECHNOLOGIES IN ENGINEERING INNOVATION MANAGEMENT	373-381

Laser Technology

Arturs Abolins, Didzis Adejanovs LASER POLISHED STAINLESS STEEL USE IN FOOD INDUSTRY, A REVIEW	385-390
Imants Adijāns SCRATCH-TEST RESPONSE OF COLOR LASER-MARKED AISI 304 STAINLESS STEEL FOR A 7 × 7 LASER-PARAMETER MATRIX	391-395
Dimitar Dichev, Iliya Zhelezarov, Tsanko Karadzhov, Kaloyan Libchev BAYESIAN METHOD FOR RECURSIVE COMBINATION OF MEASUREMENT AND PRIOR INFORMATION FOR ACCURACY IMPROVEMENT IN VIDEO-BASED MEASUREMENTS	397-403
Dimitar Dichev, Iliya Zhelezarov, Tsanko Karadzhov, Kaloyan Libchev AN ADAPTIVE KALMAN FILTER FOR VIDEO-BASED TRACKING WITH DYNAMIC ADAPTATION OF COVARIANCE MATRICES	405-411
Nikolay Dolchinkov, Milen Tortorikov LASER MARKING ON SAMPLES WITH CHROMIUM-NICKEL COATING	413-417
Hristo Hristov METHOD FOR SYNTHESIS OF STATE CONTROLLER WITH OBSERVER FOR AN ELECTROHYDRAULIC POWER TRANSMISSION SYSTEM	419-425
Hristo Hristov, Georgi Iliev, Ivailo Nikolaev AN EXPERIMENTAL STUDY OF THE FREQUENCY RESPONSE OF AN ELECTROPNEUMATIC POSITIONING SYSTEM WITH A RODLESS CYLINDER FOUR HIGH SPEED PNEUMATIC VALVES AND PWM CONTROL	427-431

Hristo Hristov STATE CONTROLLER SYNTHESIS FOR AN ELECTROHYDRAULIC POWER TRANSMISSION SYSTEM	433-439
Georgi Iliev, Hristo Hristov MODELING AND SIMULATING DYNAMIC PROCESSES IN AN ELECTROPNEUMATIC POSITIONING SYSTEM WITH PWM CONTROL AT DIFFERENT LENGTHS OF THE PNEUMATIC LINES	441-447
Tsanko Karadzhov, Iliyan Gospodinov, Dimitar Dichev, Iliya Zhelezarov DEVELOPMENT OF A METHOD FOR CALIBRATION OF A SEMICONDUCTOR TEMPERATURE MEASUREMENT SENSOR	449-455
Lyubomir Lazov, Nikolay Angelov, Prodan Prodanov, Normunds Teirumnieks COMPARATIVE ANALYSIS OF NUMERICAL AND EXPERIMENTAL RESULTS IN LASER HARDENING OF 42CRMO4 STEEL	457-464
Lyubomir Lazov, Nikolay Angelov, Erika Teirumnieka INFLUENCE OF PASS CONFIGURATION, RASTER STEP, AND SCANNING SPEED ON LASER COLOR MARKING OF AISI 304 STEEL	465-473
Dimcho Pulov OPTIMIZATION-BASED FIRST-ORDER SYNTHESIS OF INFRARED TRIPLET SYSTEMS FOR LWIR IMAGING	475-481