



<p>Embedded systems in robotics: Fuzzy rule base interpolation knowledgebase algorithms analysis for parallelisation; Pose determination for vehicles at low velocity;</p>	<p>t d i l u n t f e o c o o f m m A u n t i o c m a t i o n</p>	<p>Since the start of Industry 4.0 Embedded systems and robotics became an important factor of electronic product manufacturing. Pose determination, behavioural control are important in manufacturing, self driving of robots in industrial environment require pose determination for robots at low velocity, then for robot control can be used fuzzy interpolation methods. Using reconfigurable hardware such as FPGA and Adaptive Compute Acceleration Platforms are good support for parallelization and dynamic reconfigurations of the control system if needed.</p>	<p>1. Bartók Roland; Vásárhelyi József: Parallelization of FIVE method on multicore embedded system In: Drótos Dániel, Vásárhelyi József; Czap László (szerk.) Proceedings of the 19th International Carpathian Control Conference (ICCC 2018) Konferencia helye, ideje: Szilvásvárad, Magyarország 2018.05.28. IEEE, pp 400-403 (2018) 2. Bartók Roland; Vásárhelyi József: Fuzzy Rule Interpolation Based Object Tracking and Navigation for Social Robot. LECTURE NOTES IN MECHANICAL ENGINEERING (2195-4356 2195-4364): 2018 pp 370-375 (2018) Vehicle and Automotive Engineering 2. DOI ISBN: 9783319756769 Scopus 3. Ahmed Bouzid; József Vásárhelyi; Sara Imene Boucetta: The P5OC 5 LP LABBOOK : Practical Exercises for Embedded Systems and Architecture Subject. Miskolc-Egyetemváros : Éditions Universitaires Européennes, könyv (2018) 4. Ahmed Bouzid; József Vásárhelyi: Survey About the P5OC5 LABBOOK LECTURE NOTES IN MECHANICAL ENGINEERING (2195-4356 2195-4364): 2018 pp 519-525 (2018) Vehicle and Automotive Engineering 2. Nyelv: Angol   DOI ISBN: 9783319756769 Scopus 5. Ahmed Bouzid; József Vásárhelyi: Hardware Acceleration Design and Implementation for Inertial Navigation Applications In: Drótos Dániel Vásárhelyi József; Czap László ; Ivo Petráš (szerk.) Proceedings of the 19th International Carpathian Control Conference (ICCC 2018) Konferencia helye, ideje: Szilvásvárad, Magyarország 2018.05.28. IEEE, pp 15-18 Paper 35. (2018) Nyelv: Angol   DOI ISBN: 9781538647622 IEEE Xplore WoS Scopus DOI</p>	<p>FIK University of Miskolc</p>	<p>Integrated engineering systems for digital production; Subprogram: Development smart technologies for effective use of natural resources</p> <p>Integrated engineering systems for digital production</p>
<p>Modeling and scrutinizing feasibility of cooperating processors</p>	<p>The modern HW accelerators, through introducing the machine instructions, pipeline, DMA, etc. till now provided acceptable rates of computing performance. The Von Neumann model only required a "proper sequencing" in executing machine instructions, which enabled to use also interrupts, sharing control by using direct memory access, or even multiprocessing. The reason of the appearance of the multi-core (MC) processors was that single-processor performance could not be increased any more. In the today's MC processors several highly capable cores are in close proximity with each other. If one can properly reinterpret the program, task, then the MC can cooperate. Requires rethinking the computing paradigms, cooperation among actors of computing and refactoring the tasks like HW-SW cooperation.</p>	<p>1. Végh J. Vásárhelyi J.; Drótos D: Can parallelization save the (computing) world? In: Drótos Dániel, Vásárhelyi József; Czap László; Ivo Petráš (szerk.) Proceedings of the 19th International Carpathian Control Conference (ICCC 2018) Konferencia helye, ideje: Szilvásvárad, Magyarország 2018.05.28. Budapest: IEEE, p. 1. (2018) Nyelv: Angol   DOI Scopus WoS IEEE Xplore Befoglalás link(ek): ISBN: 9781538647622. Vásárhelyi József, Drótos Dániel, Turán János, Végh János: Processors, FPGAs, SOCs, trends and questions. CARPATHIAN JOURNAL OF ELECTRONIC AND COMPUTER ENGINEERING 5 : (1) pp. 149-152. pp. 149-152. <i>dokumentum típusa: Folyóiratcikkek; Szakcikkek; nyelv: angol</i> 3. Végh, János; Vásárhelyi, József; Turán, János; Drótos, Dániel: The von Neumann computer model on the mirror of new technologies pp. 411-416. In: Igor, Podlubny; János, Kácz; Ágata, Nawrocka; Bogdan, Sapinski (szerk.) Proceedings of the 14th International Carpathian Control Conference. ICC 2013, Piscataway (NJ), Amerika Egyesült Államok : IEEE, (2013) DOI: 10.1109/ICCC.2013.6646222. Vásárhelyi, József; Drótos, Dániel ; Végh, János. (3) számítási technikák keresése. In: Bircs, Károly; Ágoston, Sebestyén-Pál; Gyöngy (szerk.) ENELKO 2017. XVIII. Energetika-Elektrotechnika Konferencia : SzámOkT 2017 : XVII. Nemzetközi Számítástechnika és Oktatás Konferencia, Kolozsvár, Románia : Erdélyi Magyar Tudományos Társaság, (2017) pp. 241-246. 6 p. 5. János, Végh ; Péter, Molnár : József, Vásárhelyi: A figure of merit for describing the performance of scaling of parallelization. ARXIV PREPRINT 2016 pp. 1-14. , 14 p. (2016), arXiv:Google scholar.</p>	<p>Modeling and scrutinizing feasibility of cooperating processors, University of Miskolc</p>	<p>Integrated engineering systems for digital production; K 125547 NKF Modeling and scrutinizing feasibility of cooperating processors;</p>	<p>Integrated engineering systems for digital production</p>
<p>Experimental and numerical investigation of processes in energy engineering and chemical machinery</p>	<p>Research related to energy engineering and chemical machinery covers theoretical, numerical and experimental aspects of areas in both fundamental and applied research. In fluid and heat engineering investigations include flow around a circular cylinder, processes in turbomachines and heat engines, analysis of flow noise, diagnosis of internal and external combustion engines, energy performance of buildings, systems of public utilities. The second group investigates processes and technologies in the chemical industry such as heat exchangers, mechanical and hydromechanical topics, and absorption and drying operations. In addition, the optimal parameters for systems or equipment with respect to a given objective function are determined. The research is supported by modern, well-equipped laboratories.</p>	<p>Bencs, Péter ; Szabó, Szilárd ; Daria, Oertel: Simultaneous measurement of velocity and temperature field in the downstream region of a heated cylinder ENGINEERING REVIEW 34 : 1 pp. 7-13. (2014) Dorogi, D.; Baranyi, L.: Numerical simulation of a freely vibrating circular cylinder with different natural frequencies OCEAN ENGINEERING 158 pp. 196-207. 12 p. (2018) Viktória Kállai, János Keressi, Péter Mészey, Gábor L. Szepesi : Ethane-Ethylene Rectification Column's Parametric Examination. Ethane-Ethylene Rectification Column's Parametric Examination CHEMICAL ENGINEERING TRANSACTIONS 70 pp. 1477-1482. 6 p. (2018) Petrík, Máté ; Szepesi, Gábor L. ; Varga, Tibor: Numerical and Experimental Study of Finned Tube Heat Transfer Characteristics LECTURE NOTES IN MECHANICAL ENGINEERING 2018 pp. 563-570. 8 p. (2018) Tibor, Varga ; Gábor, Szepesi ; Zoltán, Siménfalvi: HORIZONTAL SCRAPED SURFACE HEAT EXCHANGER – EXPERIMENTAL MEASUREMENTS AND NUMERICAL ANALYSIS POLLACK PERIODICA: AN INTERNATIONAL JOURNAL FOR ENGINEERING AND INFORMATION SCIENCES 12 : 1 pp. 107-122. 16 p. (2017)</p>	<p>Kézi szerszámépegécsatolmányok elméleti és kísérleti vizsgálata, Robert Bosch Dorogi, D.; Baranyi, L.: Power Tool Kft., 2008 A VÁSÁRSONMÁENYI VÍZKIVÉTELI MŰ SZÁVTYÚJNAK ENERGETIKAI FELÜLVIZSGÁLATA, Beréviz Kft., 2008 Hűtőszekrény, hűtőáldát és két hőterti hűtőszekrények hőtechnikai modelljének kidolgozása és alkalmazása energetikai hatások javítására, UNI-FLEXYS Kft., 2011 HVAC egység vizsgálata és fejlesztése (Robert Bosch Energy and Body Systems Kft. - FIEK – 2017-2018.) Tartós testek lerakódás és kormozódás, valamint motor elhasználódás és olajfogasztás vizsgálatára. (AUDI Hungaria Zrt. – 2014, 2015, 2016.)</p>	<p>Hűtőventilátor rezgésanalízise (Bosch-GINOP projekt 2018.) GINOP-2.3.4-15-2016-00004 GINOP-2.3.4-15-2016-00004 Korszerű anyagok és intelligens technológiák FIEK létrehozása a Miskolci Egyetemen. Konzorciumi partnerek: Borsodchem Zrt., Robert Bosch Energy and Body Systems Kft., Starters E-Components Generators Automotive Hungary Kft., EMI Nonprofit Kft. 2017-2020. OTKA 109860 Objektumok és rendszerek optimalizálása (2015-2017) LOCARI+, Lokális türelem kitett függőleges oszlopok hőmérséklet elemzése, RFCS-2016/RFCS-2016 754072 (Brussel), 2017.07.01-2018.12.31. TÁMOP 4.2.1C-14/1/Konv-2015-0012 Miskolc Egyetem Város 2015 A Miskolci Egyetem és Miskolc város összehangolt tudástranszfer és innovációs szolgáltatás fejlesztése és fenntartható partnerség kiépítése stratégiai gazdasági szereplők bevonásával. Ilkényi szerves szennyvízanyagokat tartalmazó nagy sőtartalmú gyűjtőszennyvíz és szerves-vegyipari szennyvíz tisztítása, a kinyert szennyvízanyagok regenerálása és újrahasonosítása. Ipari partnerek: ÉMK – Észak-magyarországi Környezetvédelmi Kft. Sajóbábony, „KIS” Szerelő és Kereskedő Kft. Sajóbábony.</p>	<p>Power plant structures and their integrity Simulation-based technology and product development</p>
<p>Sustainable energy based research</p>	<p>The sustainable energy based research are the theoretical and practical research which lead reachable and operatable the energy production and consumption infrastructures for the next generations. Such research are the hydro machinery and solar power utilization research. Furthermore the biomass research mainly about the energy density increasing technologies and development of 2nd generation of bio-fuels. Additionally of these research we are working on the LCA centered product, process and manufacturing development.</p>	<p>Hajdú S.; Lakatos K.: Állítható laptozószű keresztáramú turbinák. GÉP 1 pp. 35-38. (2012) Szamosi Z.; Lakatos K.; Bereczki S.: Repair of Kaplan turbine shaft sealing based on evaluation of hydraulic conditions, IOP Conference Series: Earth and Environmental Science, 2012, 15(PART 7) Bodnár L.: Electric parameters determination of solar panel by numeric simulations and laboratory measurements during temperature transient. Acta Polytechnica Hungarica. Óbuda University, Budapest, Hungary, Vol. 15, No. 4, 2018, pp. 59-82 Szamosi Z., Marti Rosas C.: Sustainability study of the torrefaction technology. International Scientific Conference on advantages in mechanical engineering, 09-10. 10. 2014. Szamosi Z., Tóth, P., Kóds, T., Baranyai, V. Z., Szepesi, G. L., &amp; Siménfalvi, Z. (2017). Explosion characteristics of torrefied wheat straw, rape straw, and vine shoots fuels. Energy and Fuels, 31(11), 12192-12199.</p>	<p>Biomassza vizsgálata és energetikai hasznosítására kísérleti kazán telepítése ipari környezetben, Zolner Elektronik Kft, 2008</p>	<p>GINOP-2.3.4-15-2016-00004 Korszerű anyagok és intelligens technológiák FIEK létrehozása a Miskolci Egyetemen, 2017-2018</p>	<p>Power plant structures and their integrity Simulation-based technology and product development</p>
<p>Investigation of metal structures and pressure vessels and systems</p>	<p>The design of metal and welded structures requires a combination of analysis, technological requirements and economy. These structures include cranes, silos, trusses, presses, frames, stiffened plates and shells, robot arms, fiber reinforced composites, heat exchangers, pressure vessels, and so on. It is necessary to examine the structural integrity of pressure systems and explosive technologies in non-operational states.</p>	<p>Farkas J.; Jármai K.: Design and optimization of metal structures, Horwood Publishers, Chichester, UK, 2008. 328 p. ISBN: 978-1-904275-29-9 Farkas J.; Jármai K.: Optimum design of steel structures, Springer Verlag, Heidelberg, 2013. 288 p. ISBN 978-3-642-36867-7, http://dx.doi.org/10.1007/978-3-642-36868-4 Farkas József, Jármai Károly: Innovatív design of metal structures, Gazdász-Elastik Kiadó és Nyomda, 2015, 592 old. ISBN 978-963-358-064-6 (in Hungarian) Siménfalvi, Zoltán Modelling of Spring Loaded Safety Valve as an Important Device for Pressure Vessels and Piping Protection pp. 292-298. in: Baldea, Raj, B.K., Choudhury, K., Velusamy - Pressure Vessels and Piping Volume 1. - Codes, Standards, Design and Analysis Mikáczó, Viktória ; Siménfalvi, Zoltán ; Szepesi, Gábor L.: Investigation of Pressure Rise in Automotive Airbags LECTURE NOTES IN MECHANICAL ENGINEERING 2018 pp. 466-475. 10 p. (2018)</p>	<p>Paks Nuclear Power Plant Operating Time Extension Project. Pump strength check, ASME calculations. 2006-2008. Technological design of METHANOL synthesis gas technology. Strength planning of main equipment according to EN 13445. Ormoszén Kft. Checking the safety discs of RDR-9400 and RDR-9402 for the pressure limiting of R9400 and R-9402 and the suitability of the installed blowout system. TEVA Pharmaceuticals Ltd. - Debrecen TV-7820 (Pridopidine HCl) Production 2015 Mátral Erdőmű Zrt. Investigation of the residual lifetime of the main steam gate valves to be built in block V. 2012th</p>	<p>GINOP-2.3.4-15-2016-00004 Modern Materials and Smart Technologies Creating FIEK at the University of Miskolc. Consortium Partners: Borsodchem Zrt., Robert Bosch Energy and Body Systems Ltd., Starters E-Components Generators Automotive Hungary Htd., EMI Nonprofit Ltd. 2017-2020. Economic dimensioning of welded structures, with particular reference to fire protection and efficient optimization procedures, OTKA (Budapest), 2009-2013 No. 75678 TÁMOP 4.2.1C-14/1 / Konv-2015-0012 University of Miskolc City 2015 The University of Miskolc and the City of Miskolc are developing coordinated knowledge transfer and innovation services and building a sustainable partnership involving strategic economic actors. Cleaning of high salinity pharmaceutical and organic chemical wastewater containing volatile organic pollutants, regeneration and recycling of recovered pollutants. Industrial partners: ÉMK - Northern Hungary Environmental Protection Ltd. Sajóbábony, „KIS” Mechanic and Dealer Ltd. Sajóbábony GOP -2011-1.1.1 Support of market-oriented research and development activities. Developing a prototype of a low to medium power sorption system with a reversible heat pump, with a particular focus on renewable and non-renewable waste heat as an energy source. ESX Ltd. 2011-2013. OTKA 109860 Optimizing Objects and Systems (2015-2017)</p>	<p>Power plant structures and their integrity Simulation-based technology and product development</p>

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<p>Investigation of metal structures and pressure vessels and systems</p>	<p>The design of metal and welded structures requires a combination of analysis, technological requirements and economy. These structures include cranes, silos, trusses, presses, frames, stiffened plates and shells, robot arms, fiber reinforced composites, heat exchangers, pressure vessels, and so on. It is necessary to examine the structural integrity of pressure systems and explosive technologies in non-operational states.</p>	<p>Farkas J., Jármál, K.: Design and optimization of metal structures, Horwood Publishers, Chichester, UK, 2008. 328 p. ISBN: 978-1-904275-29-9 Farkas J., Jármál, K.: Optimum design of steel structures, Springer Verlag, Heidelberg, 2013. 288 p. ISBN 978-3-642-36867-7, http://dx.doi.org/10.1007/978-3-642-36868-4 Farkas József, Jármál Károly: innovatív design of metal structures, Gazdasz-Elasztik Kiadó és Nyomda, 2015, 592 old. ISBN 978-963-358-064-6 (in Hungarian) Siménfalvi, Zoltán Modelling of Spring Loaded Safety Valve as an important Device for Pressure Vessels and Piping Protection pp. 259-268. In: Baldev, Raj, B.K., Choudhary, K., Velusamy - Pressure Vessels and Piping Volume 1. : Codes, Standards, Design and Analysis Mikácso, Viktória; Siménfalvi, Zoltán; Szepesi, Gábor L.: Investigation of Pressure Rise in Automotive Airbags LECTURE NOTES IN MECHANICAL ENGINEERING 2018 pp. 466-475. , 10 p. (2018)</p>	<p>Paks Nuclear Power Plant Operating Time Extension Project. Pump strength check. ASME calculations. 2006-2008. Technological design of METHUNOL synthesis gas technology. Strength planning of main equipment according to EN 13445. Ormoszén Kft. Checking the safety discs of RDR-9400 and RDR-9402 for the pressure limiting of R9400 and R-9402 and the suitability of the installed blowout system. TEVA Pharmaceuticals Ltd. - Debrecen TV-7820 (Triopridinone HCl) Production 2015 Mátrai Erőmű Zrt. Investigation of the residual lifetime of the main steam gate valves to be built in block V. 2012h</p>	<p>GINOP-2.3.4-15-2016-00004 Modern Materials and Smart Technologies Creating FIEK at the University of Miskolc. Consortium Partners: Borsósdohem Zrt., Robert Bosch Energy and Body Systems Ltd., Starters E-Components Generators Automotive Hungary Ltd., ÉMI Nonprofit Ltd. 2017-2020. Economic dimensioning of welded structures, with particular reference to fire protection and efficient optimization procedures, OTKA (Budapest), 2009-2013 No: 75678 TÁMOP 4.2.1C-14/1 / Konv-2015-0012 University of Miskolc City 2015 The University of Miskolc and the City of Miskolc are developing coordinated knowledge transfer and innovation services and building a sustainable partnership involving strategic economic actors. Cleaning of high salinity pharmaceutical and organic chemical wastewater containing volatile organic pollutants, regeneration and recycling of recovered pollutants. Industrial partners: ÉMK - Northern Hungary Environmental Protection Ltd. Sajóbáony, „KIS” Mechanic and Dealer Ltd. Sajóbáony GOP -2011-1.1.1 Support of market-oriented research and development activities. Developing a prototype of a low to medium power sorption system with a reversible heat pump, with a particular focus on renewable and non-renewable waste heat as an energy source. BSX Ltd. 2011-2013. OTKA I09860 Optimizing Objects and Systems (2015-2017)</p>	<p>Power plant structures and their integrity Simulation-based technology and product development</p>	
<p>Measurement and simulation of automotive electrical and electronic equipment</p>	<p>Using modern computer technology, it is possible to simulate the car's electrical and electronic equipment, which can be used both for educational and development purposes, or for research purposes. The simulation results are validated by measurement. For good evaluation, the model can be used successfully in industrial and scientific activities.</p>	<p>1) Csaba Blága, Sensorless Determination of Load Current of an Automotive Generator Applying Neuro-Fuzzy Methods, LECTURE NOTES IN MECHANICAL ENGINEERING F12 (2017), University of Miskolc, Vehicle and Automotive Engineering, Proceedings of the IC2016, Miskolc, Hungary, 2016.11.17 -2016.11.18. (pp. 355-373.) 2) Blága Csaba, Szabó Norbert, Simulation and measurement of a voltage regulator of an automotive generator, 16th International Power Electronics and Motion Control Conference and Exposition, PEMC 2014, September 21-24, Antalya, Turkey, ISBN 978-1-4799-2062-4, (pp. 767-772) 3) Blága Csaba, Kovács Ernő, Modeling and Measurement of a Starter, Proceedings of the Ed2011, 16th International Symposium on Power Electronics - Ed 2011, Novi Sad, Republic of Serbia, October 26th -28th, 2011, ISBN 978-86-7892-355-5, Paper No. T3-1.1 (pp. 1-5) 4) Blága Csaba, Kovács Ernő, Modeling and Measurement of an Alternator, 17th Int. Conference on Electrical Drives and Power Electronics, The High Tatras, Stara Lesna, Slovakia 28-30 September, 2011, Proceedings, ISBN 978-80-553-0734-3 (pp. 210-214) 5) Blága Csaba, Simulation of Performance Curves for Starters, CONAT 2010, International Congress on Automotive and Transport Engineering, Proceedings - Volume V, Advanced Engineering methods, Romania, Brasov, 2010. October 27-29, Transilvania University Press, ISSN 2069-0401 (pp. 93-100)</p>	<p>Baross project</p>	<p>Baross project</p>	<p>Simulation-based technology and product development</p>	
<p>Application of power electronics and servomotors in industrial and vehicle drives</p>	<p>The clean operation, good controllability and high efficiency offered by the electric drives allow for a wider range of applications. With the development of power electronics and regulatory principles, only the battery limits the use of electric drives in cars. They promote their distribution through society's laws and tenders.</p>	<p>1) Csaba Blága, Bence Eckl, Green Engineering Solutions at Propulsion of Passenger Cars PROCEIA ENGINEERING 181, (2017) The 10th International Conference Interdisciplinarity in Engineering, INTER-ENG 2016, "Petru Maior" University of Targu-Mures, Romania 2016 October 6 - 7. (pp. 4-11.) 2) Blága Csaba, Eckl Bence, Személygépkocsi alternatív hajtásának lehetőségei, ENELKO 2016 - XVII. Nemzetközi Energetika-Elektrotechnika Konferencia, Erdélyi Magyar Műszaki Tudományos Társaság (EMT), Kolozsvár, Románia, 2016.10.06-2016.10.09. ISSN 1842-4546 (pp. 9-14.) 3) Blága Csaba, A kerékgépmotorok, Maradj talpon ha tudsz... Autótechnika szakfolyóirat, X-Mediotr Lapkiadó, Oktatás- és Rendezvényszervező Kft., Győr, 2014/2. szám, HU- ISSN 1588-9858, (pp. 34-36) 4) Blága Csaba, Kovács Ernő, Some Myths and Facts of Electric Road Vehicles, SPEEDAM 2014 - Proceedings, INTERNATIONAL SYMPOSIUM ON Power Electronics, Electrical Drives, Automation and Motion, Ischia, Italy, 18th - 20th June, 2014, ISBN: 978-1-4799-4750-8, IEEE Catalog Number: CFP1448A-USB, 978-1-4799-4749-2/14/531.00 Q2014 IEEE (pp. 922-927 on USB) (szóbeli előadás angol nyelven és angol nyelvű cikk a kiadványban) 5) Blága Csaba, Some Myths and Facts of Electric Road Vehicles, IFK 2014, Innováció és fenntartható felszíni közlekedés – konferencia, Budapest, 2014. augusztus 25-27, ISBN 978-963-88875-2-8, CD-ROM Magyar Mérnöki Akadémia, Dr. Péter Tamás (pp. 200-205) (szóbeli előadás angol nyelven és angol nyelvű cikk)</p>	<p>Baross project</p>	<p>Baross project</p>	<p>Simulation-based technology and product development</p>	

<p>Measurement of electromagnetic disturbances and network reactions</p>	<p>S t i t u t e  o f  E l e c t r i c a l  a n d  E l e c t r o n i c</p>	<p>The issue of electromagnetic compatibility (EMC) is a growing problem with electrical appliances and equipment and the spread of electronic devices. As power-electronics control becomes ever-present, disturbances on the network require attention of the profession. The measurement and testing of electromagnetic disturbances require special equipment and specialized professional knowledge.</p> <p>1) Blága Csaba, Reactive Power Analysis of Single Phase Power Control - the 6th part, The Publications of the MultisScience - XXVIII. microCAD International Multidisciplinary Scientific Conference, Section C3: Electrical Engineering and Informatics, University of Miskolc, 10-11 April 2014, ISBN 978-963-358-051-6 (pp. 1-6 on CD) 2) Blága Csaba, Vezetékek egyfázisú táplálás hálózati meddőteljesítmény analízise - 4. rész, ENELKO 2012, XIII. Nemzetközi Energetika-Elektrotechnika Konferencia, Erdélyi Magyar Műszaki Tudományos Társaság, Gyulafehérvár, 2012. október 11-14., ISSN 1842-4546, (pp. 32-37) 3) Blága Csaba, Beavatkozó szervek (aktuátorok) váltakozó áramú vezérlésének hálózati hatásai, Elektrotechnika szakfolyóirat, 2012/06, HU ISSN 0367-0708, (pp. 5-8) 4) Blága Csaba, Új generációs elektromos készíterszámok RFI analízise, Szárfűrés, Kutatás-fejlesztési zárójelentés, Mechatronikai és Logisztikai Rendszerek Regionális Egyetemi Tudásközpont, Miskolci Egyetem, 2008. december (81 oldal) 5) Blága Csaba, Új generációs elektromos készíterszámok RFI analízise, Utvefűrés, Kutatás-fejlesztési zárójelentés, Mechatronikai és Logisztikai Rendszerek Regionális Egyetemi Tudásközpont, Miskolci Egyetem, 2008. december (90 oldal)</p>		<p>E-mobility from Miskolc: Further development of a cooling water circulation pump and a motor cooling fan, taking into account the higher quality requirements expected in electric vehicles, GINOP-2.2.1-15-2017-00090; MLR - RET BOSCH research, ELMÜ-EMASZ ordering</p>	
<p>Investigation of propagation and attenuation characteristics of flexible waves including applications of Fourier Transformation.</p>		<p>Investigation of propagation and attenuation characteristics of flexible waves, model development. Development of new complex measuring-data acquisition-processing software in LabVIEW. Applications of Fourier Transformation: in case of non-equidistantly measured data, noise suppression. Development of series expansion inversion method.</p> <p>1. Somogyiné Molnár Judit: Komplex mérő-adatgyűjtő-feldolgozó szoftver fejlesztése LabVIEW-ban az akusztikus hisztérezis vizsgálatára. VILLAMOSMÉRŐNÖKI TUDDOMÁNYOK 1(1) pp. 173-180. (2018) 2. Dobróka Mihály, Nuamah Daniel Oduro Boatay, Somogyiné Molnár Judit, Ormos Tamás: A robust inversion-based Fourier Transformation algorithm used in the Interpretation of non-equidistantly measured magnetic data. INTERNATIONAL CONFERENCE ON COMPUTATIONAL METHODS 5: pp. 903-907. (2018) 3. Somogyiné Molnár Judit, Dobróka Mihály, Kiss Anett: Measuring and interpreting P and S wave velocity data – an application of a new petrophysical model. In: 79th EAGE Conference &amp; Exhibition 2017. Konferencia helye, ideje: Paris, Franciaország, 2017.06.12-2017.06.15. Paper We P9 01. 5 p. 4. Somogyiné Molnár Judit, Kiss Anett, Dobróka Mihály: Joint Inversion Based P/S Wave Velocity Data Processing to Test a New Rock Physical Model Describing Acoustic Hysteresis. In: Near Surface Geoscience 2016. Konferencia helye, ideje: Barcelona, Spanyolország, 2016.09.04-2016.09.08. European Association of Geoscientists and Engineers (EAGE), Paper We 22P2 22. 5 p. 5. M. Dobróka, H. Szegedi, J. Somogyi Molnár, P. Szűcs: On the Reduced Noise Sensitivity of a New Fourier Transformation Algorithm. MATHEMATICAL GEOSCIENCES 47(6) pp. 679-697. (2015)</p>			<p>Simulation-based technology and product development</p>
<p>Musical note frequency analyzing and displaying them on LED matrix displays</p>		<p>Comparing different frequency analyzing methods, research on spectrum analyser machines, search for fundamentals and harmonics in complex musical sounds. Musical note recognition hardware with suitable display unit. How to make an LED matrix display.</p> <p>1. Zenei hangok valósidejű számítógépes analízise (2017, Miskolci Egyetem, szakdolgozat pp. 1-59.) 2. Zenei hangok számítógépes felismerési módszerei (2017, Műszaki Tudomány az Észak-Kelet Magyarországi Régióban, pp. 90-97) 3. Zenei hangok valósidejű számítógépes analízise (2016 ősz, Miskolci Egyetem, TDK dolgozat) 4. Zenei hangok számítógépes felismerési módszerei (2017 tavasz, Miskolci Egyetem, TDK dolgozat) 5. Spektrum analízátor STM32-vel (2018 tavasz, Miskolci Egyetem, TDK dolgozat) 6. Matrik kijelző készítése mikrovezérlővel (2018, OGÉI, XXVI. Nemzetközi Gépészeti Konferencia, pp. 103-106.) 7. LED mátrix kijelző készítése (2018, Villamosmérnöki Tudományok 1., pp. 159-162.) 8. LED mátrix kijelző készítése (2017 ősz, Miskolci Egyetem, TDK dolgozat)</p>			<p>Simulation-based technology and product development</p>
<p>Energy efficiency analysis of solar (PV) power plant</p>	<p>E n g i n e r g y</p>	<p>To find out how and to what extent the increased temperature – due to the illumination and surface contaminations – affects the idle and working voltage of the solar cell, as well as its safety and effects on the backfeed to the power grid. The investigation of the effects of voltage changes of the solar panel on the power grid is also expedient. It can affect, for example, the voltage symmetry, the total harmonic distortion or can cause rapid voltage swings, which pose a significant threat to the safe operation of the power grid.</p> <p>1. Bodnár I., Koós D.: Determination of temperature coefficient and transient electrical characteristics of a cooled and non-cooled solar module. Proceedings of the 19th International Carpathian Control Conference (ICCC 2018). Konferencia helye, ideje: Sálvavárad, Magyarország, 2018.05.28-2018.05.31. Budapest: IEEE Hungary Section, 2018. pp. 570-573. (ISBN:978-1-5386-4762-2) 2. Bodnár I.: Electric parameters determination of solar panel by numeric simulations and laboratory measurements during temperature transient. ACTA POLYTECHNICA HUNGARICA 15(4) pp. 59-82. (2018) 3. Bodnár I., Iski P., Koós D., Stribanek Á.: Examination of electricity production loss of a solar panel in case of different types and concentration of dust. 3rd International Conference on Engineering Sciences and Technologies: ESAT 2018. Konferencia helye, ideje: Tatranské Matliare, Szlovákia, 2018.09.12-2018.09.14. Košice: Technical University of Kosice, 2018. Paper 008. 4 p. 4. Koós D., Iski P., Stribanek Á., Bodnár I.: Solar simulator development for small size solar cell measurements. 3rd International Conference on Engineering Sciences and Technologies: ESAT 2018. Konferencia helye, ideje: Tatranské Matliare, Szlovákia, 2018.09.12-2018.09.14. Košice: Technical University of Kosice, 2018. Paper 036. 4 p. 5. Bodnár I.: Transient electrical characteristics of asolar cell in the case of a cooling and noncooling solar cell. ANNALS OF FACULTY OF ENGINEERING HUNEDOARA - INTERNATIONAL JOURNAL OF ENGINEERING 15(4) pp. 175-178. (2017)</p>		<p>1. HEIbus. Smart HEI-Business collaboration for skills and competitiveness 575660-EPP-1-2016-1-FI-EPPKA2-KA. Project topic: Implementing IoT and lifecycle management in photovoltaic area. 2. The described project was carried out as part of the EFOP-3.6.1-16-2016-00011 "Younger and Renewing University – Innovative Knowledge City – institutional development of the University of Miskolc aiming at intelligent specialisation" project implemented in the framework of the Szechenyi 2020 program. The realization of this project is supported by the European Union, co-financed by the European Social Fund.</p>	<p>Power plant structures and their integrity</p>
<p>Simulation-based power plant development</p>		<p>This project presents a thermokinetic modelling on the gasification process done on the acacia-tree under varying industrial circumstances and different humidity levels. The gasification does not produce flue gas, but due to imperfect burning synthesises gas which is rich in flammable components (CO2 and H2). The chemical structure of this gas is depends on the components of the fuel and the humidity levels but greatly affected by the technological parameters, also such as parameters are the pressure and the temperature, as well as the air-ratio. The study introduces the changing in the conjunction, the fuel value and the reaction efficiency due to varying gasification temperature and pressure. Rising temperature results in improved efficiency, while the higher pressure worsens the reaction efficiency. However at higher temperature intervals the effect of the pressure is neglectable.</p> <p>1. Bodnár I., Stribanek Á., Iski P., Blága C.: Simulation of acacia gasification process with variable operating pressure and temperature. Proceedings of the 19th International Carpathian Control Conference (ICCC 2018). Konferencia helye, ideje: Sálvavárad, Magyarország, 2018.05.28-2018.05.31. Budapest: IEEE Hungary Section, 2018. pp. 597-602. (ISBN:978-1-5386-4762-2) 2. Bodnár I.: Fás száru biomassza és települési szilárd hulladékok termikus hasznosítása. Miskolc: Miskolci Egyetem, 2017. 164 p. (ISBN:978-963-12-7604-6) 3. Bodnár I.: Efficiency of co-Generated Power Production Based on Woody Biomass. JOURNAL OF COMPUTER SCIENCE AND CONTROL SYSTEMS 10(1) pp. 5-10. (2017) 4. Iski P., Bodnár I.: Fás száru biomasszából történő villamosenergia-termelés modellezése és hatékonyságvizsgálata. Műszaki Tudomány az Észak-Kelet Magyarországi Régióban 2017. konferencia előadásai. 630 p. Konferencia helye, ideje: Nyíregyháza, Magyarország, 2017.06.01 Debrecen: Debreceni Akadémiai Bizottság Műszaki Szakbizottsága, 2017. pp. 154-161. (ISBN:978-963-7064-35-7) 5. Bodnár I., Pláztán B.: Fás száru biomasszák pirolitikus hasznosításának termokinetikai modellezése. GÉP 67(3) pp. 5-12. (2016)</p>		<p>The described project was carried out as part of the EFOP-3.6.1-16-2016-00011 "Younger and Renewing University – Innovative Knowledge City – institutional development of the University of Miskolc aiming at intelligent specialisation" project implemented in the framework of the Szechenyi 2020 program. The realization of this project is supported by the European Union, co-financed by the European Social Fund.</p>	<p>Simulation-based technology and product development</p>

Signal processing		Research and study of analysis methods of transient phenomena, development of time-, frequency- and time-frequency representation methods, search for optimal implementation platform, implementation.	<ol style="list-style-type: none"> <li>1. Tóth L, Szabó N.: LabWindows/CVI-ban fejlesztett Wavelet transformációs modul alkalmazása LabVIEW környezetben MULTIDISZCIPLINÁRIS TUDOMÁNYOK: A MISKOLCI EGYETEM KÖZLEMÉNYE 3: pp. 215-224., 2013, ISSN: 2062-9737</li> <li>2. L.Tóth, T. Tóth: On Finding Better Wavelet Basis for Bearing Fault Detection, Acta Polytechnica Hungarica, Vol. 10, No. 3, pp. 17-35, 2013, ISSN 1785-8860, impact faktor: 0.471, 8 citations</li> <li>3. L.Tóth, T. Tóth: Construction of a Realistic Signal Model of Transients for a Ball Bearing with Inner Race Fault, Acta Polytechnica Hungarica, Vol. 10, No. 1, pp. 63-80, 2013, ISSN 1785-8860, impact faktor: 0.471, 3 citations</li> <li>4. Tóth L: Transzients jelek vizsgálata virtuális Műszerezéssel, GÉP, LXIII. évfolyam, 2012/2. szám, pp. 75-78, ISSN 0016-8572</li> <li>5. L. Tóth: Wavelet Analysis of a Ball Bearing with Inner Race Fault, MicroCAD 2012 International Scientific Conference, Miskolc, 2012., ISBN 978-963-661-773-8</li> </ol>			Simulation-based technology and product development
Study of electron impact processes in atomic physics by means of coincidence electron spectrometry		The angular and energy distributions of electrons coming from electron-atom collisions are measured by cylindrical mirror electrostatic analysers. By the coincidence technique (e,2e) measurement) two electrons coming from the same atom are detected simultaneously (e.g. the Auger- electron, and the ionizing electron). We study the outer- and inner shell processes of noble gases, with special regard to resonant Auger process and the quantum mechanical interference between the competing processes.	<ol style="list-style-type: none"> <li>1. B. Paripás, J.J. Jureta, B. Palásthy, B.P. Marinković and G. Pszota: High resolution study of the autoionizing states of He in their exchange interference energy region, Journal of Electron Spectroscopy and Related Phenomena, Vol. 225 (2018) pp. 10-15. (IF: 1.661)</li> <li>2. B. Paripás, B. Palásthy and M. Béres: Experimental study on the interference of autoionizing states of He, Nuclear Instruments&amp; Methods in Physical Research, Section B: Beam Interactions with Materials and Atoms, Vol. 369. (2016) 34-39. (IF: 1.109)</li> <li>3. B. Paripás, B. Palásthy and G. Pszota: Experimental (e,2e) study of state-to-state interference between autoionizing states of He, European Physical Journal D, (2015) 69: 34 (IF: 1.208)</li> <li>4. B. Paripás, B. Palásthy and M. Zitnik: Experimental (e,2e) study of exchange interferences in the resonant Auger decay of Ar induced by electron impact, Journal of Electron Spectroscopy and Related Phenomena, Vol. 189 (2013) pp. 65-70. (IF: 1.553)</li> <li>5. B. Paripás and B. Palásthy: (e,2e) and (e,3-1e) coincidence experiments for studying the PCI effect of low energy ionizing electrons in the Auger process of Ar, Journal of Electron Spectroscopy and Related Phenomena, Vol. 185 (2012) pp. 602-608. (IF: 1.706)</li> </ol>			
Development of precision laser interferometric motion analyzers and their engineering applications	I n s t i t u t e  o f  P h y s i c s	Development of laser interferometric motion analysers (of Michelson type) in laboratory (on vibration-free table) and portable quality, Precise (accuracy > 0.1 µm) engineering applications of this method. Laser Doppler Vibrometry (LDV) and Torsion Vibrometry (LTV) and its engineering applications. Laboratory support of teaching of technical laser physics.	<ol style="list-style-type: none"> <li>1. Miklós Béres and Béla Paripás: Measurement of vibration by laser Doppler method in the course of drilling, Series Title: Lect.Notes Mechanical Engineering, Book Title: Vehicle and Automotive Engineering2, K. Jármai and B. Bolló (eds.), Book Subtitle: Proceedings of the 2nd VAE2018, pp.199-208 (2018) Miskolc, Hungary, ISBN: 978-3-319-75676-9, Springer</li> <li>2. Miklós Béres and Béla Paripás: Comparison of two laser interferometric methods for the study of vibrations, Series Title: Lect.Notes Mechanical Engineering, Book Title: Vehicle and Automotive Engineering, K. Jármai and B. Bolló (eds.), Book Subtitle: Proceedings of the VAE2016, Chapter 20, pp.205-216 (2017) Miskolc, Hungary, ISBN: 978-3-319-51188-7, Springer</li> <li>3. Béres Miklós, Paripás Béla: Fűrészár rezgéseinek mérése lézér Doppler módszerrel, Multiscience – XXXI. microCAD International Multidisciplinary Scientific Conference, C2: Natural Sciences, ISBN 978-963-358-132-2, University of Miskolc (C2/4), April 20-21, 2017.</li> <li>4. Béres Miklós, Majár János, Rónai László, Paripás Béla: Precíziós sebességmérés lézérinterferometrius módszerrel, Miskolci Egyetem Közleményei Multidiszciplináris Tudományok, 6. kötet. (2016) 1 sz. pp. 9-19.</li> <li>5. Béres Miklós, Paripás Béla, Majár János, Bodolai Tamás, Rónai László, Ilavszky Vanda: Rezgések precíziós összehasonlító vizsgálata lézérinterferometrius módszerekkel, Multiscience – XXX. microCAD International Multidisciplinary Scientific Conference, C3: Natural Sciences, ISBN 978-963-358-113-1, University of Miskolc (C3/4), April 21-22, 2016.</li> </ol>	Participation in the Wigner RCP coordinated EXMET – EXtreme Materials, Energies and Technologies „Academic Excellence Program” (903010-14 2014)		Simulation-based technology and product development
Numerical simulation of physical processes		Calculation of the ground state of strongly correlated electron-systems and investigation of its physical properties. Analytical investigation and numerical simulation of interacting magnetic multilayers and multiparticle-systems in the presence of changing external magnetic field. Numerical solution of partial differential equations which describe the flow of liquids and gases through porous media.	<ol style="list-style-type: none"> <li>1. D. M. Forrester, F. Kusmartsev and Endre Kovács, Designing magnetic superlattices that are composed of single domain nanomagnets, Beilstein J. Nanotechnol (2014), 5, 956–963. (IF: 2.326)</li> <li>2. Michael Forrester, Feodor Kusmartsev and Endre Kovács, Switching dynamics of doped CoFeB trilayers and a comparison to the quasistatic approximation, PHYS. REV. B 87, 174416, (2013) (IF: 3.664)</li> <li>3. Endre Kovács, Z. Gulácsi, Electron Pairs in the Ground States of Chain Structures, J Supercond Nov Magn., 2012 (DOI 10.1007/s10948-012-2028-9). (IF: 0.702)</li> <li>4. Réka Trencsényi, Katalin Gulácsi, Endre Kovács, and Zsolt Gulácsi, Exact ground states for polyphenylene type of hexagon chains, Ann. Phys. (Berlin) 523, No. 8 – 9, 741 – 750 (2011) (IF: 0.841)</li> <li>5. Réka Trencsényi, Endre Kovács, Zsolt Gulácsi, Correlation and confinement induced itinerant ferromagnetism in chain structures, Phil. Mag. B, Volume 89, Issue 22, 2009, p. 1953 – 1974 (IF: 1.273)</li> </ol>			Simulation-based technology and product development
Description of compact astrophysical objects and the emitted gravitational waves		The purpose of the research is to provide the most accurate description possible about the dynamics of the compact astrophysical bodies and of the binary systems that they make up. This includes calculating the waveforms of the gravitational radiation emitted by the binary systems, and determining the properties of the electromagnetic signals on the broadest frequency range possible.	<ol style="list-style-type: none"> <li>1. J. Majár and B. Miklóci: Second order spin effects in the spin precession of compact binaries, Physical Review D86, 064028 (2012), IF: 4.558</li> <li>2. J. Majár, P. Forgács, M. Vasúth: Gravitational waves from binaries on unbound orbits, Physical Review D82, 064041 (2010), IF: 4.964</li> <li>3. J. Majár: Spin-spin interaction in the spin-precession equations, Physical Review D80, 104028 (2009), IF: 4.922</li> <li>4. J. Majár and M. Vasúth: Gravitational Waveforms for Spinning Compact Binaries, Physical Review D77, 104005 (2008), IF: 5.050</li> <li>5. Pszota, G., Zhang, H., Yuan, F., Cul, W.: Origin of X-ray emission from transient black hole candidates in quiescence. 2008, Monthly Notices of the Royal Astronomical Society, 389, 423. IF: 5.185</li> </ol>			
Dimensioning and investigating of elements of gear drives, planetary and harmonic drives		The research covers: the tooth geometry, strength, kinematics and dynamics of normal gear units, gear planetary gear and differential gear, as well as planetary gear, gearboxes. Choosing the optimum gearbox, determining the energy flow and efficiency, Tolerance of small-module plastic gears, the development of a tolerance method that takes into account the deformation of materials, i.e. the relationship between loads and dimensions. 3D printing design issues.	<ol style="list-style-type: none"> <li>1. Bilhari, János: Kisméretű műanyag fogaskerekek tervezési és fejlesztési kérdései 107 p. PhD értekezés 2016, Védés éve: 2017</li> <li>2. Bilhari, János: HEATING BEHAVIOUR OF SMALL PLASTIC GEARS, DESIGN OF MACHINES AND STRUCTURES 2 : 1 pp. 5-14. Paper: ISSN 1785-6892, 10 p. (2012)</li> <li>3. Németh Géza, Péter József, Németh Nándor, A new type of epicyclic traction drive, ADVANCES IN MECHANICAL ENGINEERING 1:(1) pp. 137-142. (2013) (ISBN 978-963-473-623-3)</li> <li>4. Bmori, Zoltán; Szente, József; Bognár, Gabriella: Choosing Profile Shift Coefficients for Spur Gears, SOLID STATE PHENOMENA (ISSN: 1012-0394) (eISSN: 1662-9779) 261: pp. 416-421. (2017)</li> <li>5. Barka, Ferenc : Dobróczoni, Ádám: Using metal foams in gear-drives to reduce the emitted noise DESIGN OF MACHINES AND STRUCTURES 4 : 1 pp. 65-76., 12 p. (2014)</li> </ol>	<ol style="list-style-type: none"> <li>1. Új haszongépjármű hajtáslánc, magasabb hatásfokú, nagyobb teljesítményű, alacsonyabb zajszintű és kiterjesztett élettartammal rendelkező hajtóművek kifejlesztése GINOP 2.2.1-15-2016-00017, Rába Futómű Gyártó és Kereskedelmi Kft. 2016-2020.</li> <li>2. GINOP 2.3.4.-15-2016-00004 FIEK Fogazategyeztetés, SEGA Miskolc 2018.</li> </ol>		Simulation-based technology and product development
Fluid film bearings, tribological research of frictional surfaces, tribology	I n s t i t u t e	Analysis of journal bearings due to the material of sleeve, the elastic deflection of the shaft and the properties of the reliable lubricant. Environmental point of views, harmless lubricant (water) in bearings. Flexible sleeve materials. Relation between the increasing accuracy of rolling bearings and the lubrication characteristics. Use of traction lubricants that provide high coefficient of friction in traction drive. Selection of lubricant for complex friction systems. Lubrication of seals. Analytical investigations of tribological phenomena.	<ol style="list-style-type: none"> <li>1. Madászné Bognár, Gabriella: Analysis of tribological phenomena in viscous fluid flows over solid surfaces: MTA doktori Thesis</li> <li>2. 2013</li> <li>3. Németh Géza, Péter József, Fáy Árpád, Berecztei Sándor: Sűrűdő felületpárok biztonságos elválasztásának ellenőrzése nagy alakváltozások esetén, GÉP 64(6) (p. 78-81. (2013)</li> <li>4. Szabó Ferenc János: Multidisciplinary Optimization of Journal Bearings, using a RVA evolutionary type optimization algorithm ACTA POLYTECHNICA HUNGARICA 13(7) pp. 181-195. (2016)</li> <li>5. Babócskó Szabó, Sándor Kovács: EHD Contact Modelling of Gleason Bevel Gears FME TRANSACTIONS 43:(3-) pp. 233-240. (2015)</li> </ol>	<ol style="list-style-type: none"> <li>1. TISZALÓKI VÍZERŐMŰ TURBINA-TENGELY BEHAJLÁSÁNAK ELLENŐRZŐ SZÁMÍTÁSA ÉS A FŐCSAPÁGYYÉTERHELÉSÉNEK MEGHATÁROZÁSA, Tiszavíz Vízerőmű Kft., 2012</li> <li>2. 2013</li> <li>3. TET_14-FR-1-2015-0004 Nanostrukturált örszerveződés felületeken, Francia-magyar TET projekt 2015-2017</li> <li>4. 90au23 Wirkung der Oberflächenbehandlung auf die tribologischen Eigenschaften, OMAA Osztrák-magyar projekt, 2015-2017</li> <li>5. GINOP 2.3.4.-15-2016-00004 FIEK Csapágykendőanyag fejlesztése, BOSCH Miskolc 2018.</li> </ol>		Simulation-based technology and product development

Computer Aided Design, design methodology	<p>o f M a c h i n e a n d P r o d u c t D e s i g n</p>	<p>On one hand side the aim of the research topic is to research classical design methodology, finding theories and solutions that are capable to adopt for computer or designed for computer application. The task is to develop design methodology with the help of the informatics. On the other hand, it is to research the applications, the limits and the usage techniques of the 3D digitalizing techniques. In connection with this modifying digitalized elements in CAD system and producing them by applying prototype technologies.</p>	<p>1. Balács Ágnes: Computer Aided Concept Building, SOLID STATE PHENOMENA 261: pp. 402-407. (2017) 2. Balács Ágnes: Környezet szempontú ajánlások a koncepcióális tervezés során, GEP 68(4) pp. 73-76. (2017) 3. Barka Ferenc, Takács Ágnes: A gyártási és szerelés költségcsökkentése – esszétanulmány, GEP 67(7-8) pp. 71-76. (2016) 4. Balács Ágnes: Green principles DESIGN OF MACHINES AND STRUCTURES 4(1) pp. 99-104. (2014) 5. Balács Ágnes: Számítógéppel segített koncepcióális tervezési módszer, PhD. disszertáció, 136 p., 2010. 6. Barka, Ferenc; Tóbiás Zsolt: Application possibilities of 3d scanning and prototyping in the manufacturing of packaging tools – case study, DESIGN OF MACHINES AND STRUCTURES 7 : 2 pp. 20-30., 11 p. (2017) 7. Barka, Ferenc: Cost Reduction of Manufacturing and Assembly - Case Study, SOLID STATE PHENOMENA 261 pp. 495-502. . 8 p. (2017) 8. Bömötör Cs., Péter, J.: Natural Analogies and TRIZ, International Journal of Advanced Engineering, Vol. 6, No. 1., ISSN 1846-5900, Croatia, 2012. november, pp. 15-22 9. Bömötör Cs.: Természeti analógiák adatbázisának statisztikai elemzése, GEP, 2014., Vol. 65, No. 6-7., ISSN 0016-8572, pp. 13-17.</p>	<p>1. Porszívó készülékek DFMA alapú tervezése, Electrolux Lehel Kft, 2013, 2014 2. Hűtő- és fagyasztó készülékek DFMA alapú tervezése, Electrolux-Lehel Kft. 2014 3. Gyártósori kiszolgáló berendezés tervezése és prototípus gyártása, IBM Kft., 2009 4. Műszaki szakvélemény csavarkötésről, Jabil Circuit Magyarország Kft., 2015. 5. Csokoládéfigure emelő, betető és fényező szerzem tervezése és gyártása, Nestlé Hungária Kft., 2015-2017</p>	<p>1. 3D holografikus képek rögzítésére alkalmas fotopolimer rendszer GINOP 2.2.1-15-2017-00086, 2017-2021</p> <p>Simulation-based technology and product development</p>
Vibration diagnostics, acoustics in machine design, environmental protection, maintenance	<p>P r o d u c t D e s i g n</p>	<p>Our institute has a decade-long tradition of cultivating the acoustic science, examining the effects of noise and vibration, attenuation, influencing, measuring, and applications of noise. The technical aspects of acoustics have a special role in the institute, including diagnostics of machines and equipment, as well as their maintenance, also the investigation of noise as environmental pollution, respectively, additional technical acoustic testing, eg. modal analysis, order analysis, etc.</p>	<p>1. AHS 60-26 típusú sövényvágó gép zaj alapelemzése Megbízó: Robert Bosch Power Tool Kft. Elektromos Szerszámgyártó Kft., 2014 2. Matisz Norbert, Bihari Zoltán: Hőátviteli gépek zajterhelése, GEP 67(7-8) pp. 30-33. (2016) Géptervezők és TermékfejlesztőkXXII. szemináriuma. Miskolc, Magyarország: 2016.11.10 -2016.11.06 3. Bihari Zoltán, Matisz Norbert: Acoustic investigation of Vacuum Cleaners, DESIGN OF MACHINES AND STRUCTURES 6:(1) pp. 15–20. (2016) 4. Bihari Zoltán, Julkász Adám: Investigation of friction coefficient measuring machine: Sűrűdségi tényező mérő gép vizsgálata, The Publications of the Multiscience-XXX. microCAD International Multidisciplinary Scientific Conference. Konferencia helye, ideje: Miskolc, Magyarország, 2016.04.21-2016.04.22. Miskolc: University of Miskolc, 2016. pp. 1-6. (ISBN 978-963-358-113-1) 5. Illics Károly: Simulation Methods in the Vehicle Noise, Vibration and Harshness (NVH), LECTURE NOTES IN MECHANICAL ENGINEERING F12 pp. 91-97. (2017)</p>	<p>1. Új haszongépjármű hajtáslánc, magasabb hatásfokú, nagyobb teljesítményű, alacsonyabb zajszintű és kiterjesztett élettartammal rendelkező hajtóművének kifejlesztése GINOP 2.2.1-15-2016-00017, Rába Futómű Gyártó és Kereskedelmi Kft. 2016-2020. 2. GINOP 2.3.4–15-2016-00004 FIEK Ventilátor rezeg vizsgálata, BOSCH Miskolc 2018. 3. 575660-EPP-1-2016-FI-EPPKA2-KA ERASMUS+ Knowledge Alliances Developing a pipe air flow resistance measuring device for vacuum cleaner pipes, Electrolux Lehel Kft. 2017</p>	<p>Simulation-based technology and product development</p>
Simulation based analysis of machine elements, structures and products	<p>D e s i g n</p>	<p>Application of conceptual design and several other design- theories in the design practice of machine elements, products and machine structures, verification of variants or ready- product by simulation before the fabrication. Multidisciplinary finite element simulations for the analysis of several real- life operational situations or test- situations. Implementation of the simulation results into development and improvement process of the products or machine elements, structures in order to decrease the mass, increase the load carrying capacity or improving some important characteristics. Optimization, Multidisciplinary Optimization (MDO), for example in case of sliding bearings the several disciplines handled during the optimization could be: temperature, fluid flow, continuum mechanics, tribology, wear, statics, dynamics.</p>	<p>1. Szilárdágvizsgálat, ME TUKI 2010. 2. Tankok végelelemes vizsgálata, Modine Kft. 2010.</p> <p>1. Szabó Ferenc János: Optimization Possibilities and Methods in Product Development and Qualification DESIGN OF MACHINES AND STRUCTURES 2:(1) pp. 63-72. (2012) 2. Szabó Ferenc János: Optimization of Springs Applied in Vehicle Suspension Structure LECTURE NOTES IN MECHANICAL ENGINEERING (ISSN: 2195-4356) (eISSN: 2195-4364). 803 p. 3. B. Belezna, S.I. Szávi: Application of the Beremin Model for Cruciform Specimen to Determine the Fracture Probability in Case of WPS STRENGTH OF MATERIALS 45:(4) pp. 489-494. (2013) 4. B. Dudra, Sz. Szávi: Lifetime analysis of wver reactor pressure vessel Internals concerning material degradation STRENGTH OF MATERIALS 42:(1) pp. 51-57. (2010) 5. Bogár, Gabriella: Similarity solution of boundary layer flows for non-Newtonian fluids INTERNATIONAL JOURNAL OF NONLINEAR SCIENCES AND NUMERICAL SIMULATION (ISSN: 1565-1339) 10: (11-12) pp. 1555-1566. (2009)</p>	<p>1. SZILÁRDÁGVIZSGÁLAT, ME TUKI 2010. 2. Tankok végelelemes vizsgálata, Modine Kft. 2010.</p> <p>1. GINOP 2.3.4–15-2016-00004 FIEK Ventilátor kiegészítő, BOSCH Miskolc 2018. 2. 129257_K_18 kutatás: Új eredmények vékony filmek növekedési mechanizmusára és néhány tribológiai jellemzőre 2018-2022 3. TÉT_14-FR-1-2015-0004 Francia-magyar TÉT, Nanostruktúrák önszerveződése felületeken 2015-2016</p>	<p>Simulation-based technology and product development</p>
Theoretical and experimental examination of high-precision face milling with special tool	<p>D e s i g n</p>	<p>The research topic is face milling carried out with a special milling tool Our goal is to reveal the mechanical, thermal and force-doctrine conditions of chip removal under such special chip ratio conditions. Some principles of cutting under these conditions will be revealed and the quality and integrity of surfaces generated by this type of milling will be investigated. The results of cutting theory will be applied to the calculation of force and tool life, to the plastic and elastic chip root deformations, and to thermal processes.</p>	<p>1. Kunderák J., Gyáni K., Felhő C., Deszpoth, I.: The effect of the shape of chip cross section on cutting force and roughness when increasing feed in face milling, 2017 Manufacturing Technology 17(3), pp. 335-342 2. Kunderák J., Felhő C.: Topography of the machined surface in high performance face milling, Procedia CIRP Volume 77, 2018, Pages 340-343 3. Kunderák J., Markopoulos A. P., A. Makkai T., Nagy A.: Theoretical and Experimental Analysis of the Effect of Chip Size Ratio on Cutting Forces in Face Milling of Steel, International Journal of Mechanical Engineering, Volume 3, 2018, pp.: 29-35. 4. Kunderák J., Felhő C.: Investigation of the topography of face milled surfaces, 2018 Materials Science Forum, 919, pp. 78-83 5. Kunderák János, Felhő Csaba: Investigation of the Topography of Face Milled Surfaces, Materials Science Forum, 2017. Vol. 919, pp. 78-83</p>	<p>Research and development of precision machining technologies and manufacturing processes, 2017, ZF Hungária Kft. Research and development of the production process of gearbox components, 2018, ZF Hungária Kft.</p>	<p>OTKA K116876: Theoretical and experimental examination of high-precision face milling with special tool, 2015-2019 DFG 316141494: Inverse cutting technology - a new strategy in face milling, 2016.09.-2018.08. DAAD 73526: Process characteristics of special milling and topography of the milled surface, 2016-2017 EFOP-3.6.1-16-00011 "Younger and Renewing University – Innovative Knowledge City – institutional development of the University of Miskolc aiming at intelligent specialisation" project 2017-2020</p>
Precision Machining	<p>D e s i g n</p>	<p>We have contributed to the improvement of the durability and reliability of machine parts with hardened surfaces by process characteristics investigations of two machining procedures and by the exploration and scientific analysis of their effect on surface quality. Effective material removal and the formation of surfaces meeting the working requirements was ensured in one operation either by grinding after hard turning (combined procedure) or by continuously varied contact on the tool edge. We identified a criteria system to ensure the determining characteristics of the procedures and the reliability of the process by theoretical and experimental investigations.</p>	<p>1. Kunderák J., Mamalis, A.G., Szabó, G., Pálmai, Z., Gyáni, K.: Numerical examination of residual stresses developing during hard turning at different rake angles, International Journal of Advanced Manufacturing Technology, 89(5-8), pp. 1989-1999 2. Kunderák J., Gyáni, K., Tóvári, B., (...) , Toth, R., Markopoulos, A.P.: Thermomechanical modelling of hard turning: A computational fluid dynamics approach, 2017 Simulation Modelling Practice and Theory, 70, pp. 52-64 3. Kunderák J., Molnar, V., Deszpoth, I.: Decision-making in procedure selection on the basis of efficiency in machining hardened surfaces, International Journal of Mechanical Engineering, Volume 3, 2018, pp.:36-42 4. Kunderák, J., Gacsi, Z., Gyáni, K., et al: X-ray diffraction investigation of white layer development in hard-turned surfaces INTERNATIONAL JOURNAL OF ADVANCED MANUFACTURING TECHNOLOGY Volume: 62 Issue: 5-8 Pages: 457-469 Published: SEP 2012 5. Kunderák J., Mamalis, AG, Markopoulos, A. Finishing of hardened boroholes: Grinding or hard cutting? MATERIALS AND MANUFACTURING PROCESSES Volume: 19 Issue: 6 Pages: 979-993 Published: 2004</p>	<p>Research and development of precision machining technologies and manufacturing processes, 2017, ZF Hungária Kft. Research and development of the production process of gearbox components, 2018, ZF Hungária Kft.</p>	<p>OTKA K116876: Theoretical and experimental examination of high-precision face milling with special tool, 2015-2019 DFG 316141494: Inverse cutting technology - a new strategy in face milling, 2016.09.-2018.08. DAAD 73526: Process characteristics of special milling and topography of the milled surface, 2016-2017 EFOP-3.6.1-16-00011 "Younger and Renewing University – Innovative Knowledge City – institutional development of the University of Miskolc aiming at intelligent specialisation" project 2017-2020</p> <p>Simulation-based technology and product development</p> <p>Development of production and logistics networks</p>
Investigation of Abrasive Waterjet Machinings	<p>I n s i t u t e</p>	<p>Abrasive waterjet cutting has become the method of machining of hardy or not machinable materials. At waterjet cutting the width of the plates technically is almost not limited, plates with high width can be easy to cut. The research is oriented mainly on investigation of the connection between the technological parameters and the efficiency and accuracy of the cut. In addition to the cutting of plates, so-called abrasive waterjet turning is more and more people applied. In the research work the connection between the technological parameters and the size and form errors of the machined cylindrical surfaces is investigated.</p>	<p>1. Kun-Bodnár K, Kunderák J, Maros Zs: Machining of Rotationally Symmetric Parts with Abrasive Waterjet Cutting, XXII. International Conference on Manufacturing 2018., Kecskemét, 2018., június 7-8. 2. Maros Zs: Effect of load energy on the form of the gap at waterjet cutting., KEY ENGINEERING MATERIALS 581: pp. 304-309. (2014) 3. Maros Zs: Energy Approach of the Taper at Abrasive Waterjet Cutting, PRODUCTION PROCESSES AND SYSTEMS 6:(1) pp. 89-96. (2013) 4. Maros Zs: Taper of Cut at Abrasive Waterjet Cutting of an Aluminium Alloy, PRODUCTION PROCESSES AND SYSTEMS 5:(1) pp. 55-60. (2012) 5. Maros Zs: Connection between the Load Energy and the Taper of the Cut at Abrasive Waterjet Cutting, REZANIE I INSTRUMENTY V TEKHNOLOGICKESKIH SISTEMAH 81: pp. 189-194. (2012)</p>	<p>TÁMOP 4.2.1.B-10/2 / CONV-2010-0001, Building on the improvement of the quality of higher education based on the development of centers of excellence in the Strategic Research Areas of the University of Miskolc</p>	<p>Simulation-based technology and product development</p>

Investigation of machining procedures having low environmental load	M a n u f a c t u r i n g  S c i e n c e	The subject of the research is to reduce the environmental load in cutting processes, which is mainly examined by choosing the quantity and quality of the used coolants and lubricants. The aim is to analyse the phenomena arising from the chip removal done at environmentally friendly conditions and to examine the conditions influencing it. For example, exploring the relationship between cutting data (cutting speed, feed rate, depth of cut) and cutting process characteristics (such as cutting force, surface roughness, size and shape errors) are theoretical, practical examinations.	1. Varga, G., Puskás, T., Debreceni, I.: Analysis of cylindrical error deviation of surfaces when using reduced amount of coolants and lubricants in machining, WSEAS Transactions on Applied and Theoretical Mechanics, 2018, Vol. 13, pp.: 103-116, E-ISSN: 2224-3429 2. Kundrák, J., Varga, G., Deszpoth, I.: Analysis of Extent of Environment Load in Alternative Manufacturing Procedures, WSEAS Transactions on Environment and Development 14, 2018, pp. 313-320 3. Varga, G., Can diamond burnishing be done in an environmentally friendly way? Applied Mechanics and Materials, 2014, Vol. 474 pp.: 411-416. , 6 p. 4. Varga, G., Kundrák, J.: Effect of environmentally conscious machining on machined surface quality, Applied Mechanics and Materials, 2013, Vol. 309, pp.: 35-42. 5. Dudás, L., Lereth, F., Varga, G.: Környezetbarát technológiák a gépgyártásban : forgácscsiszázron, minimális hűtőszel-kénesél, Budapest, Magyarország : Műszaki Könyvkiadó, 2010, 308 p., ISBN: 9789631665000 052K		NKFI K125117: Effect of environmental-load-reducing manufacturing procedures on the lifetime of machine industry components, 2017-2021 DFG 316141494: Inverse cutting technology - a new strategy in face milling, 2016.09.-2018.08. DAAD 73526: Speciális marás folyamatjellemző és a mart felület topográfiaja, 2016-2017 EFOP-3.6.1-16-00011 "Younger and Renewing University – Institutional Development of the University of Miskolc aiming at intelligent specialisation" project 2017-2020	Simulation-based technology and product development
Theoretical and experimental examination of diamond burnishing		When surface burnishing the reduction of the workpiece roughness and the strengthening of the surface layer of the workpiece are characterized by the interaction of sliding friction in between surface to be strengthening and a tool which is harder than the material to be burnished. The research task includes the determination of the effect of manufacturing process characteristics on the macro- and micro-geometric characteristics of the component surfaces (shape and position accuracy, surface roughness, bearing surface, etc.) and changes in the surface layer (microhardness, structure, residual stress). Further aim is to determine the stresses arising in the burnishing tool.	1. Varga, G., Ferencsik, V.: Analysis of Surface Topography of Diamond Burnished Aluminium Alloy Components, Lecture Notes in Mechanical Engineering, 2017, F12, Paper: 15, pp. 143-154. 2. Varga, G., Ferencsik, Viktória. Analysis of shape correctness of surfaces of diamond burnished components, MATEC WEB OF CONFERENCES 137 Paper: 01019, 8 p. (2017) 3. Varga, G., Possibility to increase the life time of surfaces on parts by the use of diamond burnishing process, Key Engineering Materials, 2016, Vol. 686, pp. 100-107. , 8 p. 4. Varga, G.: Effects of technological parameters on the surface texture of burnished surfaces, Key Engineering Materials, 2014, Vol. 581 pp.: 403-408. 5. Varga Gy, Dudás, L.: Examinations of Sliding Burnishing Using for Improving the Surface Quality of External Cylindrical Surfaces, 2000, In: Nardoni, G (editor) 15th World Conference on Non-Destructive Testing, Rome, pp. 237-242.		NKFI K125117: Effect of environmental-load-reducing manufacturing procedures on the lifetime of machine industry components, 2017-2021 EFOP-3.6.1-16-00011 "Younger and Renewing University – Innovative Knowledge City – institutional development of the University of Miskolc aiming at intelligent specialisation" project 2017-2020	Simulation-based technology and product development
CAD-based modelling of surface roughness in different machining procedures		The aim of these investigations is to simulate the theoretical topography of surfaces machined by tools having defined edge geometry on the basis of CAD modeling, based on which the expected roughness of the surfaces machined with the same parameters can be predicted. During the research, theoretical modeling of turned and face milled surfaces was performed primarily. A computational method has been developed to help determine the theoretical value of any standard 2D and 3D roughness characteristics.	1. Kundrák J., Felhő Cs.: Surface roughness prediction in face milling by special tools, KEY ENGINEERING MATERIALS 686: pp. 161-167. (2016) 2. Csaba Felhő, Bernhard Karpuschewski, János Kundrák: Surface roughness modelling in face milling, PROCEDIA CIRP 31: pp. 136-141. (2015) 3. Csaba Felhő: Investigation of surface roughness in machining by single and multi-point tools, Dr.-ing. disszertáció, Otto-von-Guericke Universität Magdeburg, 2014, 171 p. 4. Csaba Felhő, János Kundrák: Investigation of the Topography of Machined Surfaces, APPLIED MECHANICS AND MATERIALS 693: pp. 412-417. (2014) 5. Felhő C, Kundrák J.: Characterization of topography of cut surface based on theoretical roughness indexes, KEY ENGINEERING MATERIALS 496: pp. 194-199. (2012)		OTKA K116876: Theoretical and experimental examination of high-precision face milling with special tool, 2015-2019 DFG 316141494: Inverse cutting technology - a new strategy in face milling, 2016.09.-2018.08. DAAD 73526: Process characteristics of special milling and topography of the milled surface, 2016-2017 DAAD 29735: Choosing procedure for finish precision manufacturing on the base of their examination, comparing and combination, 2012-2013	Simulation-based technology and product development
Analysis of rotational turning in precision finishing		Rotational turning uses a specially designed tool with helically curved edge. The tool and the workpiece axes are parallel, the chip removal is done by the rotation of the tool. The procedure can be used to machine outer and inner cylindrical and inner and outer conical surfaces. The studied characteristics in the topic are the machined surface topography, the cross-sectional area of the chip, the alteration of the cutting force components and the possibilities for increasing the productivity.	1. Sztankovics, I ; Kundrák, J: The characteristic parameters of the twist structure on cylindrical surfaces machined by turning procedures, APPLIED MECHANICS AND MATERIALS 693 pp. 418-423. , 6 p. (2014) 2. Sztankovics, I ; Kundrák, J: Effect of the inclination angle on the defining parameters of chip removal in rotational turning, MANUFACTURING TECHNOLOGY 14 : 1 pp. 97-104. , 8 p. (2014) 3. Kundrák, J ; Gyáni, K ; Deszpoth, I ; Sztankovics, I: Some topics in process planning of rotational turning, ENGINEERING REVIEW 34 : 1 pp. 23-32. , 10 p. (2014) 4. Sztankovics, I ; Kundrák, J: Theoretical value of total height of profile in rotational turning, APPLIED MECHANICS AND MATERIALS 309 pp. 154-161. , 8 p. (2013) 5. Kundrák, J ; Sztankovics, I ; Deszpoth, I: Chip Removal Characteristics in Rotational Turning and the Effect of the Tool Diameter Alteration, ACADEMIC JOURNAL OF MANUFACTURING ENGINEERING 11 : 4 pp. 26-29. , 4 p. (2013)	Surface Quality Analysis for Functional Requirements for Parts (2014) ZF Hungária Kft. Analysis of the effects of procedures, kinematics and cutting data on twist-structure (2015) ZF Hungária kft.	OTKA 78482K: Investigation of rotational and combined process in hard turning (2009-2014) DAAD 29735 Choosing procedure for finish precision manufacturing on the base of their examination, comparing and combination (2012-2013) DAAD 73526: Process characteristics of special milling and topography of the milled surface, 2016-2017	Simulation-based technology and product development  Development of production and logistics networks
Production Informatics: solving resource scheduling problems in complex manufacturing systems	I n s t i t u t e	The motivation for our research comes from the automotive industry, where its crucial to create fine schedules for a complex manufacturing system to meet different customer needs.	1. Forrai M. ; Kulcsár, Gyula, Modeling and Solving an Extended Parallel Resource Scheduling Problem in the Automotive Industry, ACTA POLYTECHNICA HUNGARICA 14 : 4 pp. 27-46. , 20 p. (2017) 2. Kulcsár, Forrai, M., Kulcsár, Gyula, A New Scheduling Software for supporting Automotive Component Manufacturing, LECTURE NOTES IN MECHANICAL ENGINEERING F12 pp. 257-274. (2017) 3. Bikfalvi, Péter ; Erdélyi, Ferenc ; Kulcsár, Gyula ; Tóth, Tibor, On Some Functions of the MES Applications Supporting Production Operations Management pp. 103-129. , 27 p., in: Bognár, Gabriella; Tóth, Tibor (szerk.) Applied Information Science, Engineering and Technology - Selected Topics from the Field of Production Information Engineering and IT for Manufacturing: Theory and Practice, Berlin, Németország : Springer-Verlag, (2014)	Development of Production Scheduler (2014), Electrolux-Lehel Jászberény Development of Production Scheduler (2012), Electrolux-Lehel Jászberény Development of Production Scheduler (2010), Electrolux-Lehel Jászberény		Intelligent production support systems
Data mining research		Solving different industrial problems with big data and other machine learning methods. Clusterization and classification problems, image segmentation problems. From proof of concept solutions to fully integrated applications.		Reducing the number of faulty parts - International Manufacturing Company - Eger - 2018 "Rock Typing Poc" - MOL Zrt, 2018		Adaptive data mining systems
Efficient Application of Ontology-based and Logic-based Semantic Models for Intelligent Systems	o f T e c h n o l o g y	In the field of uncertainty management, we have worked out a new distance function to measure the similarities of fuzzy functions in the case of lost information. We have selected the intuitionistic logic for representation of uncertainty. We have proposed a novel ontology model which involves intuitionistic variables to represent the truth values of the predicates. The proposed model combines the classic rough set approach with the intuitionistic uncertainty representation approach. We have worked out the theoretical foundations of the proposed model. We use the methods of Formal Concept Analysis as an efficient tool on the field of concept-level modelling. We focus on the following problems: efficient lattice construction algorithms; better size approximation of the generated concept set; application of new models with enhanced attribute representation forms	1: Kovács, L: An Algorithm using Context Reduction for Efficient Incremental Generation of Concept Set, FUNDAMENTA INFORMATICA E (2018) 2: Kovács, L ; Szabó, G: Generalization of String Transformation Rules using Optimized Concept Lattice Construction Method, PROCEDIA ENGINEERING 181 pp. 604-611. , 8 p. (2017) 3: Kovács, L ; Radeleczki, S: Logical Analogies Between Intuitionistic Fuzzy Sets and Rough Sets pp. 1-14. , 14 p.: Springer Nature, (2017) 4: Kovács, L ; Radeleczki, S: Uncertainty Management in Knowledge Modelling, PROCEDIA TECHNOLOGY 19 pp. 4-11. , 8 p. (2015) 5: Kovács, László ; Varga, E. B. ; Rostás, L., Ontology Extraction from Compound Sentences in Hungarian Language, DISA 2018: IEEE, (2018) pp. 257-264. , 8 p.			Adaptive data mining systems

<p>Optimization of Decision Making Processes in Intelligent Software Systems</p>	<p>One of the key elements in intelligent systems is the efficient decision making process. We focus on the development of novel behavioral models to regulate agent activity. The aim of the project is to develop a fuzzy state machine-based behavioral model and to develop learning algorithms. The developed models are used in etho robots. We focus among others on the traveling salesman problem. On the field of TSP, we propose a novel cluster-level route refinement method. We are working on a local improvement algorithm that can increase the efficiency in incremental route construction problems. The research topic covers also wide range of information and computer science such as software engineering, signal processing and data mining. Data mining and signal processing techniques are used to create indoor positioning services. For navigation optimization, we developed both map-based and ontology based way finding services which are the two major categories in this field.</p>	<p>1: Kovács L.; Jantovics, L.; Jakovics, D: IntraClusTSP – An Incremental Intra-cluster Refinement Heuristic Algorithm for Symmetric Traveling Salesman Problem, SYMMETRY 10 : 12 p. 663 (2018)  2: László, Kovács ; Anita, Agárdi ; Balint, Debrecei: Efficiency Analysis of the Vertex Clustering in Solving the Traveling Salesman Problem, ANNALES MATHÉMATIQUES ET INFORMATIQUES 48 - 1 pp. 33-42. 10 p. (2018)  3: Bartók, Roland ; Kiss Márton ; Dr. Vásárhelyi, József ; Dr. Kovács, Szilveszter ; Ahmed, Bouzid: Embedded behavioral model implementation pp. 35-40. , 6 p. IEEE ICCE, (2016) p. 835  4: Zoltán, Kiritsán ; Szilveszter, Kovács: Double Fuzzy Point Extension of the Two-step Fuzzy Rule Interpolation Methods, ACTA POLYTECHNICA HUNGARICA 10 : 5 pp. 175-190. 15 p. (2013)  5: Dániel Péter, Kun ; Erika, Baksáné Varga ; Zsolt, Tóth: Ontology based Indoor Navigation Service for the ILONA System; INFOCOMMUNICATIONS JOURNAL 10 : 3 pp. 21-29. , 9 p. (2018)  6: Judit, Tamas ; Zsolt, Toth: Classification-based symbolic indoor positioning over the Miskolc IIS Data-set, JOURNAL OF LOCATION BASED SERVICES 1 : 0 Paper: 10.1080/17489725.2018.1455992 (2018)</p>			<p>Adaptive data mining systems</p>
<p>Development of logistic processes using lean methods</p>	<p>The lean philosophy-defined tool and rule system was initially used in the automotive industry, but today it is increasingly being used in the service sector as well. The elaboration of how to apply the system in these new areas (eg recycling, warehousing, office work, etc.) induces many research tasks.</p>	<p>[1] Illés, B., Tamás, P., Dobos, P.: Waste reduction possibilities for manufacturing systems in the industry 4.0, IOP CONF. SERIES: MATERIALS SCIENCE AND ENGINEERING 161, 2016., pp. 1-8., ISSN: 1757-8981  [2] Tamás, P., Illés, B.: Examining the Integration Possibilities for Lean Tools and Simulation Modeling, SOLID STATE PHENOMENA 261, 2017., pp. 516-522., ISSN: 1662-9779  [3] Tamás, P.: Application of a simulation investigational method for efficiency improvement of SMD method, ACADEMIC JOURNAL OF MANUFACTURING ENGINEERING 15(2), 2017., pp. 23-30., ISSN: 1583-7904  [4] Illés, B., Tamás, P., Szentesi, Sz.: Application of churchman-ackoff weighting method for procurement of consignment seller dietary supplements manufacturing companies, ACADEMIC JOURNAL OF MANUFACTURING ENGINEERING 16: (1), 2018., pp. 33-37., ISSN: 1583-7904  [5] Tamás, P.: Application of value stream mapping at flexible manufacturing systems, KEY ENGINEERING MATERIALS 686, 2016., pp. 168-173., ISSN: 1662-9795</p>	<p>[1] Realization of innovative design tasks for warehouse design and production material supply, Client: Class Hungaria Ltd.  [2] Development and intensification of the production logistic system of large-scale, self-manufactured parts used for tanks in hot water tanks, Client: Hajdú Hajdúsági Iparművek Cplc.  [3] Development and introduction of a new computer system for the full implementation of the FIFO principle in the current stockholding storage system; Client: Bosch Rexroth Pneumatika Ltd.  [4] Evaluating the current product tracking system of the Miskolc Patolyat Szolgáltató Ltd., suggestions for its further development.  [5] Development of logistic activity related to the collection of waste for the LTV Trans Környezetvédelmi Szolgáltató Ltd.</p>	<p>[1] Research into the efficiency improvement procedures of logistics processes in the frame of the EFOP-3.6.1-16-2016-00011 project  [2] UMI-TWINN project (H2020)  [3] Higher Education Institutional Excellence Program - Optimization of Natural Resources Based on Modern Technologies Theme - Research orientation of research methods and procedures for increasing the efficiency of logistic systems  [4] Application of Logistic Knowledge Transfer to the Elaboration and Development of Regional Logistic Networks and Clusters, created by Logistic Centers (project PP3 of the TAMOP-4.2.1-08 / 1-2008-0006 project)</p>	<p>Development of production and logistics networks</p>
<p>Use of simulation modeling to increase the efficiency of logistics systems</p>	<p>As a result of the desire to meet individual customer needs, the complexity of logistics processes is growing. Effective development and optimization of operating processes without the use of simulation test methods is either not possible, or it is difficult to achieve. Within the scope of the research, the concept of innovative simulation test methods is developed and implemented.</p>	<p>[1] Illés, B., Tamás, P.: Simulation examination of logistics systems in the automotive industry, JOURNAL OF PRODUCTION ENGINEERING 18: (2), 2015., pp. 69-72., ISSN: 1821-4932  [2] Illés, B., Tamás, P., Tallár, S.: Simulation of a flexible manufacturing system, ADVANCED LOGISTIC SYSTEMS: THEORY AND PRACTICE 6, 2012., pp. 25-32., ISSN: 1789-2198 [3] Tamás, P.: Application of a simulation investigational method for efficiency improvement of SMD method, ACADEMIC JOURNAL OF MANUFACTURING ENGINEERING 15(2), 2017., pp. 23-30., ISSN: 1583-7904  [4] Tamás, P.: Decision Support Simulation Method for Process Improvement of Intermittent Production Systems, APPLIED SCIENCES-BASEL 7(9), 2017., pp. 1-16, ISSN: 2076-3417  [5] Tamás, P.: Application of value stream mapping at flexible manufacturing systems, KEY ENGINEERING MATERIALS 686, 2016., pp. 168-173., ISSN: 1662-9795</p>	<p>[1] Simulation of the production process of a small series bodywork; Client: for AUDI Hungaria Motor Ltd.  [2] Realization of innovative design tasks for warehouse design and production material supply; Client: Class Hungaria Ltd.  [3] Setting up a parameterizing model for maintenance activity and developing its innovative application system; Client: Norria North Hungarian Regional Innovation Agency  [4] Evaluating the current product tracking system of the Miskolc Patolyat Szolgáltató Ltd., suggestions for its further development.  [5] Review of the automated raw materials storage system of the SBS Plc., definition of simulation testing possibilities.</p>	<p>[1] Research into the efficiency improvement procedures of logistics processes in the frame of the EFOP-3.6.1-16-2016-00011 project  [2] Researching the modeling, the evaluation and the efficiency increasing methods of material flow systems through simulation testing within the Mechatronics and Logistics Center of Excellence (TAMOP-4.2.1.B-10/2/KONV-2010-0001)  [3] UMI-TWINN project (H2020)  [4] Creating a prototype of a continuous reactor plant processing biomass, sewage sludge and other raw materials based on HTC technology (GINOP-2.2.1-15-2017-00100 project)  [5] Higher Education Institutional Excellence Program - Optimization of Natural Resources Based on Modern Technologies Theme - Research orientation of research methods and procedures for increasing the efficiency of logistic systems</p>	<p>Development of production and logistics networks</p>
<p>Quality assurance of logistics processes</p>	<p>The intensification of international competition and the shortening of the life cycle of products have a significant impact on the operations of companies, whereby the basic objective is to meet customer demands on a higher quality level, which is influenced by the development of logistics processes. During our research, we aimed at examining how customer satisfaction can be increased through the quality assurance of logistics processes and to what extent the performance of the logistics system can be increased.</p>	<p>[1] Illés B.: Troubleshooting Techniques for Logistic Processes. LOGISTICS YEAR-BOOK pp. 153-162. (2014)  [2] Glistau E., Illés B., Coelho Machado, N.I.: Quality management methods in logistics. In: Birkfalvi Péter (szerk.) XXIV. microCAD International Scientific Conference. Miskolc Egyetem Innovációs és Technológia Transzfer Centrum, 2010. pp. 13-20. ISBN-978-963-661-625-1  [3] Illés B.: The relationship of logistics and quality management HUNGARIAN QUALITY 18: (7) pp. 6-16. (2009)  [4] Illés, B., Skapinyecz, R., Wagner, Gy., Glistau, E., Coelho Machado, N.I.: Application of QFD for the handling of customer needs in automotive industry. In: Norge Isaias Coelho Machado (szerk.) COMEC 2016 IX International Scientific Conference of Mechanical Engineering, Santa Clara (CA), Kuba, 2016., Paper II/6. 14 p., ISBN-978-959-312-216-0  [5] Illés, B.: Investigation of mathematical model for quality assurance logistics. In: Martin O, Zheng X (szerk.) Latest trends in engineering mechanics, structures, engineering geology : 3rd WSEAS International Conference on Engineering Mechanics, Structures, Engineering Geology (EMESeg '10) : International Conference on Geography and Geology 2010 (WORLDGEO '10). Corfu, WSEAS Press, 2010. pp. 337-342. ISBN-978-960-474-203-5</p>	<p>[1] The development of the logistics and quality management systems of the Electrolux Lehel Ltd. vacuum cleaner factory, Client: Electrolux Lehel Ltd.  [2] The further development and standardization of the computer application to reduce the scratch-proofing of quality assurance developed by the refrigerator factory, Client: Electrolux Lehel Ltd.  [3] Review of the automated raw materials storage system of the SBS Plc., definition of simulation testing possibilities.</p>	<p>[1] Research into the efficiency improvement procedures of logistics processes in the frame of the EFOP-3.6.1-16-2016-00011 project  [2] UMI-TWINN project (H2020)  [3] Higher Education Institutional Excellence Program - Optimization of Natural Resources Based on Modern Technologies Theme - Research orientation of research methods and procedures for increasing the efficiency of logistic systems</p>	<p>Development of production and logistics networks</p>
<p>The role of logistics in the implementation of the industry 4.0 principle</p>	<p>Through the Fourth Industrial Revolution, such technological innovations and methods become available that enable the development of complex logistics systems where the entire supply chain can be operated in an automated way. As part of the research, we explore how to exploit the opportunities offered by the Fourth Industrial Revolution, how to increase the efficiency of logistics processes, and analyze the efficiency gains achieved through industry 4.0 applications for SMEs and large companies.</p>	<p>[1] Illés B.: Logistics and digitalization. LOGISTICS YEAR-BOOK 22. pp. 30-36. (2017)  [2] Tamás P., Illés B.: Process Development Opportunities for Manufacturing Systems in the Fourth Industrial Revolution. TECHNICAL SURVAY (EMT) 67: pp. 41-48. (2016)  [3] Nagy, G., Bányai, Á., Illés, B.: Impact of Industry 4.0 on Automotive Supplier Systems. In: Michael Schenk (szerk.) 11th International Doctoral Student Workshop on Logistics, Magdeburg, 2018., pp. 79-83. ISBN: 978-3-944722-71-9  [4] Tamás, P., Illés, B., Dobos, P., Skapinyecz, R.: New Challenges for Quality Assurance of Manufacturing Processes in Industry 4.0. SOLID STATE PHENOMENA 261 (2017): pp. 481-486.  [5] Tamás, P., Illés, B.: Process Improvement Trends for Manufacturing Systems in Industry 4.0. ACADEMIC JOURNAL OF MANUFACTURING ENGINEERING 14(4): pp. 119-125. (2016)</p>	<p>[1] Realization of innovative design tasks for warehouse design and production material supply, Client: Class Hungaria Ltd.  [2] Developing a computer application that supports logistics integrated production scheduling of foamed door production, Client: Electrolux Lehel Ltd.  [3] Modern Remote Diagnostic Methods and Comparative Analysis of Wired and Wireless Secure Transfer Technologies for Determining an Optimal System Architecture, Client: Borsod Volán Ltd.  [4] Review of the automated raw materials storage system of the SBS Plc., definition of simulation testing possibilities.</p>	<p>[1] Research into the efficiency improvement procedures of logistics processes in the frame of the EFOP-3.6.1-16-2016-00011 project  [2] UMI-TWINN project (H2020)  [3] Higher Education Institutional Excellence Program - Optimization of Natural Resources Based on Modern Technologies Theme - Research orientation of research methods and procedures for increasing the efficiency of logistic systems</p>	<p>Development of production and logistics networks</p>
<p>Logistics development of SMEs towards networking</p>	<p>Making better use of the available logistics resources has become one of the most important competitive factors in our day, resulting in lower unit costs and / or higher service levels. Our research is to develop and implement business models based on new networking concepts that will help increase the competitiveness of a region's SMEs.</p>	<p>[1] Illés B., Tamás P.: Increase the competitiveness of small and medium-sized enterprises through the development of a virtual logistics center. LOGISTICS YEAR-BOOK pp. 112-118. (2014)  [2] Tamás P., Illés B.: The operational concept of a regional-scale virtual logistics company. MACHINE 64.(1) pp. 55-58. (2013)  [3] Tamás P., Illés B.: The concept of a virtual logistics center for a Hungarian Region. JOURNAL OF PRODUCTION ENGINEERING 18(2): pp. 107-110. (2015)  [4] Nagy, G., Bányai, Á., Illés, B.: Supply Chain Optimization for Networking Production Companies. In: Michael Schenk (szerk.) 10th International Doctoral Student Workshop on Logistics, Magdeburg, 2017., pp. 119-124. ISBN: 978-3-944722-57-3  [5] Skapinyecz, R., Illés, B.: Concepts of risk-management in virtual logistics systems. In: Michael Schenk, Bala Illés, Norge I Coelho Machado, Eke Glistau, Jun' Tokuju (szerk.) 6th International Doctoral Students Workshop on Logistics, Magdeburg, 2013. pp. 55-59. ISBN-978-3-940961-94-5</p>	<p>[1] Optimizing delivery and component delivery systems for inventory of supply chain scheduling for automotive suppliers. Client: SÁPU Ipari és kereskedelmi limited partnership  [2] Development of logistic activity related to the collection of waste for the LTV Trans Környezetvédelmi Szolgáltató Ltd.  [3] Designing the material supply for the production line at the CLAAS Hungaria Ltd.  [4] Development and intensification of the production logistic system of large-scale, self-manufactured parts used for tanks in hot water tanks, Client: Hajdú Hajdúsági Iparművek Cplc.</p>	<p>[1] The project-element with the title "Application of Logistic Knowledge Transfer to the Elaboration and Development of Regional Logistic Networks and Clusters, created by Logistic Centers" of the project titled "Developing and operating the Center for Technology and Knowledge Transfer at the University of Miskolc" and numbered TAMOP-4.2.1-08 / 1-2008-0006  [2] Researching the development of regionally designed virtual logistics networks within the framework of the Mechatronics and Logistics Excellence Center. (TAMOP-4.2.1.B-10/2/KONV-2010-0001)  [3] Research into the efficiency improvement procedures of logistics processes in the frame of the EFOP-3.6.1-16-2016-00011 project  [4] UMI-TWINN project (H2020)</p>	<p>Development of production and logistics networks</p>



<p>The role of logistics principles in smart transport systems</p>	<p>Intelligent transport systems are becoming more and more important today. From the point of view of the sustainability of transport systems, it is very important to have adequate information on transport systems as only real-time data can be used to optimize passenger and freight transport. In the course of our research, we aimed at examining the logistic system design and logistics processes required for the development and optimum operation of smart transport systems.</p>	<p>[1] B Illés, Gy Sárközi: The maintenance logistics process of vehicle of transport by computer-aided code identification system. In: COMEC (szerk.) Proceedings of the 5th International Scientific Conference of Mechanical Engineering, Santa Clara, Universidad Central Marta Abreu de Las Villas, 2008. p. CD. ISBN:978-959-250-404-1  [2] Sárközi, Gy., Illés, B.: Telematics-Based Logistic Solutions for Demand Responsive Rural Public Transport in Hungary. In: microCAD 2013: XXVII. International Scientific Conference. Miskolci Egyetem, Paper J2.  [3] Illés, B., Németh, J.: Sensitivity analysis of road transport by sensibility of production-function. KEY ENGINEERING MATERIALS 581: pp. 539-546. (2014)  [4] Illés, B., Ladányi, R., Sárközi, Gy.: Periodic timetable optimization in the public road transport services. ADVANCED LOGISTIC SYSTEMS: THEORY AND PRACTICE 3: pp. 209-226. (2009)  [5] Bányai, T., Illés, B., Bányai, Á.: Smart Scheduling: An Integrated First Mile and Last Mile Supply Approach. COMPLEXITY 2018: Paper 5180156. 15 p. (2018)</p>	<p>[1] Modern Remote Diagnostic Methods and Comparative Analysis of Wired and Wireless Secure Transfer Technologies for Determining an Optimal System Architecture, Client: Borsod Volán cP.C.  [2] Study on the introduction of the Galileo navigation system. Client: Borsod Volán cP.C.</p>	<p>[1] Research into the efficiency improvement procedures of logistics processes in the frame of the EFOP-3.6.1-16-2016-00011 project  [2] UMI-TWINN project (H2020)  [3] Higher Education Institutional Excellence Program - Optimization of Natural Resources Based on Modern Technologies Theme - Research orientation of research methods and procedures for increasing the efficiency of logistic systems</p> <p>Development of production and logistics networks</p>
<p>Computer aided geometric design</p>	<p>Nowadays in computer aided geometric design curves and surfaces are mostly described by means of the combination of control points and blending functions. Important research fields are the search for new function systems which are suitable for modelling, moreover the shape modification of this type of curves and surfaces, with special regard to constrained shape modifications.</p>	<p>- Juhász, I., Róth, A., Adjusting the energies of curves defined by control points, Computer-Aided Design, 107 (2019) pp. 77-88, <a href="https://doi.org/10.1016/j.cad.2018.09.003">https://doi.org/10.1016/j.cad.2018.09.003</a>  - Juhász, I., Róth, A., A scheme for interpolation with trigonometric spline curves, Journal of Computational and Applied Mathematics, 263, June (2014) pp. 246–261, <a href="http://dx.doi.org/10.1016/j.cam.2013.12.034">http://dx.doi.org/10.1016/j.cam.2013.12.034</a>  - Juhász, I., Róth, A., A class of generalized B-spline curves, Computer Aided Geometric Design, Vol. 30 (2013), No. 1, pp. 85–115; <a href="http://10.1016/j.cagd.2012.06.007">http://10.1016/j.cagd.2012.06.007</a>  - Róth, Á., Juhász, I., Schicho, J., Hoffmann, M., A cyclic basis for closed curve and surface modeling, Computer Aided Geometric Design, Vol. 26 (2009) No. 5, pp. 528–546, <a href="http://10.1016/j.cagd.2009.02.002">http://10.1016/j.cagd.2009.02.002</a>  - Juhász, I., Róth, A., Closed rational trigonometric curves and surfaces, Journal of Computational and Applied Mathematics, Vol. 234 (2010), No. 8, pp. 2390-2404, <a href="http://10.1016/j.cam.2010.03.009">http://10.1016/j.cam.2010.03.009</a></p>		
<p>Almost sure limit theorems, inequalities and their applications</p>		<p>- Fazekas, I., Türi, J., A limit theorem for random allocations Journal of Mathematics Research, 4:(1) pp. 17-20. (2012)  - Fazekas, I., Chuprunov, A., Türi, J., Inequalities and limit theorems for random allocations, Annales Universitatis Mariae Curie-Skłodowska Sectio A Mathematica 65: pp. 69-85. (2011)  - Türi, J., Limit theorems for the longest run, Annales Mathematicae et Informaticae 36: pp. 133-141. (2009)</p>		
<p>Tool and production geometry</p>	<p>Development of geometric model of form and position of movement transfer mechanisms, to increase of production accuracy. Exploration of contact relationships of conjugated surfaces, localization of bearing pattern of worm drive pairs with method of descriptive geometry. Production geometric development of machining tools of drive pairs elements, and it's wear test with two cameras method. Determination of bijective parts of Monge cuboid to ensure the reconstruct ability.</p>	<p>- Balajti, Zs., Examination and adjustment of the bearing pattern in case of heliocid drive, 8th CIRP Conference on High Performance Cutting, Budapest, Hungary, June 25-27, 2018. Article reference: PHOC9395109  - Balajti Zs., Dudás, I., The Monge theorem and its application in engineering practice, The International Journal of Advanced Manufacturing Technology, Vol. 91 (2017), No. 1-4, pp.: 739–749, <a href="http://10.1007/s00170-016-9763-1">http://10.1007/s00170-016-9763-1</a>  - Balajti, Zs., Potential of Application the Projective Geometry in Worm Design, Rezanie I Instrumenty v. Teknologicheskii Sistemah 81, UDK 621.91. Поступила в редакцию 15. 05. 2012. pp. 10-17.  - Balajti, Zs., New Modelling of Computer Aided Design of Worms in the Same Axis, Journal Manufacturing and Industrial Engineering, Vol. XI, No. 2, 2012, pp. 26-29.  - Dudás, I., Balajti, Zs., Péter, L., Kinematikai modell csigahajtások és szerszámok fejlesztésére, GÉP 2009/12., Vol. LX, pp. 21-24.</p>		<p>Simulation-based technology and product development</p>
<p>Nonlinear differential equation</p>		<p>Béla Kovács, M. Guedda Positive Solution for M-Point Sixth-Order Boundary Value Problem With Variable Parameter SCIENTIFIC BULLETIN OF PETRU MAIOR UNIVERSITY OF TARGU MURES 11:(2) pp. 50-61. (2014), Béla Kovács  Vibration analysis of a piezoelectric cylinder panel  JOURNAL OF COMPUTATIONAL AND APPLIED MECHANICS 9:(1) pp. 35-47. (2014) (University of Miskolc) Ravi P Agarwal, B Kovács, Donal O'Regan  Existence of positive solution for a sixth-order differential system with variable parameters  JOURNAL OF APPLIED MATHEMATICS AND COMPUTING 44:(1-2) pp. 437-454. (2014) Ravi P. Agarwal, B Kovács, D O'Regan  Existence of positive solutions for a fourth-order differential system  ANNALES POLONICI MATHEMATICI 112:(3) pp. 301-312. (2014) B Kovács, Ravi P. Agarwal, Donal O' Regan  Positive solutions for a sixth-order boundary value problem with four parameters  BOUNDARY VALUE PROBLEMS 1:(184) pp. 1-22. (2013) B Kovács  Vibration analysis of layered curved arch  JOURNAL OF SOUND AND VIBRATION 332:(18) pp. 4223-4240. (2013)</p>		
<p>Finsler geometry</p>		<p>[1] J. Szilasi, R. L. Lovas and D. Cs. Kertész, Several ways to a Berwald manifold – and some steps beyond, Extracta Mathematicae, 26 (2011), 89–130. [2] B. Aradi and D. Cs. Kertész, Isometries, Submetrics and Distance Coordinates on Finsler Manifolds, Acta Math. Hung. 143(2): 337–350; [3] B. Aradi and D. Cs. Kertész, A characterization of holonomy invariant functions on tangent bundles, Balkan J. Geom. Appl., 19(2) (2014), 1–10. [4] S. Deng, D. Cs. Kertész and Z. Yan, There are no proper Berwald–Einstein manifolds, Publ. Math. Debrecen, 86 (2015). [5] D. Cs. Kertész and R. L. Lovas, A generalization and short proof of a theorem of Hano on affine vector fields, SUT Journal of Mathematics 53(2) (2017), 83–87.</p>		
<p>Data analysis using statistical methods and its agricultural applications</p>		<p>Stafner G, Németh Cs, Bicanic D, Lantos Z, Doka O, Photopyroelectric assessment of the thermal effusivity of fresh hen egg and of rehydrated egg powders, JOURNAL OF THERMAL ANALYSIS AND CALORIMETRY 120:(1) pp. 363-368. (2015), Enzsol Erzsébet, Lantos Zsuzsanna, Varga-Haszonits Zoltán, Varga Zoltán, Determination of winter barley yield by the aim of multiplicative successive approximation, WEATHER / QUARTERLY JOURNAL OF THE HUNGARIAN METEOROLOGICAL SERVICE 115:(3) pp. 166-178. (2011), Varga-Haszonits Zoltán, Varga Zoltán, Lantos Zs, Enzsol Erzsébet, Miličs Gábor, Effect of soil water supply on the water demand of crops, AGROCHEMISTRY AND SOIL SCIENCE (60): pp. 75-86. (2011), Lantos Zsuzsanna, Varga Zoltán, Varga-Haszonits Zoltán, Enzsolné Gerencsér Erzsébet, Agro-climatological analysis of the utilisation of radiation of crops, AGRO-21 Brochures 2010:(59) pp. 66-73. (2010), Kuroli G, Lantos Zs, Changes in abundance of aphids flying over and feeding on broad bear in a period of 20 years ARCHIVES OF PHYTOPATHOLOGY AND PLANT PROTECTION 41:(4) pp. 261-272. (2008)</p>		
<p>Partially ordered sets, lattices and their applications</p>		<p>Aggregation on a Finite Lattice, ORDER, 32: pp. 1-18. (2015), Gryngiel J. and Radeleczki, S.: On the tolerance lattice of tolerance factors, Acta Math. Hungar, 141 (3) (2013), 220-237., Foldes, S. and Radeleczki, S.: Interval lattices are balanced, Demonstratio Mathematica, 49(3) pp. 271-281. (2016), Chajda I, Radeleczki S.: An approach to orthomodular lattices via lattices with an antitone involution, Math. Slovaca 66(4) pp. 773-780. (2016), Dzik W., Radeleczki S, Direct Product of <math>\mathcal{E}</math>-Algebras and Unification: an Application to Residuated Lattices, Journal of Multiple Valued Logic and Soft Computing, 28:(2-3) pp. 189-215. (2017).</p>		

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<p>Concept lattices, Rough sets</p>		<p>Ganter, B., Körei, A. and Radeleczki, S.: Extent partitions and context extensions, <i>Math. Slovaca</i>, 63 (4) (2013), 693–706, Toth, T., Körei, A., Radeleczki, S., Veres, L.: A new mathematical approach to supporting Group Technology, <i>European J. of Industrial Engineering</i>, Vol. 8, No. 5, (2014), 716–737, Järvinen, J., Radeleczki, S.: Representation of Nelson algebras by rough sets lattices determined by quasiororders, <i>Algebra Universalis</i>, 66 (2011), 163–179, Järvinen, J. and Radeleczki, S.: Monteiro spaces and rough sets determined by quasiororder relations: Models for Nelson algebras, <i>Fundamenta Informaticae</i>, 131 Nr. 2. (2014), 205–215, Järvinen, J. and Radeleczki, S.: Rough sets determined by tolerances, <i>International Journal of Approximate Reasoning</i>, 55(6), (2014), 1419–1438. The publications belonging to group 2 were part of the University project: TAMOP-4.2.1.B-10/2/KONV-2010-0001 project supported by the European Union, co-financed by the European Social Fund.</p>				<p>Adaptive data mining systems, Integrated engineering systems for digital production</p>
<p>Unary algebras, Partially ordered algebras</p>		<p>D. Jakubikova-Studenovská, R. Pöschel, and S. Radeleczki, The lattice of compatible quasiororders of acyclic monounary algebras, <i>Order</i> 28 (2011), 481–497, Jakubiková-Studenovská, D., Pöschel, R. and Radeleczki, S.: Irreducible quasiororders of monounary algebras, <i>Journal of Austral Math. Soc. Ser. A</i> 93 (2012), 259–276, Chajda I., Radeleczki S.: Involutive right-residuated I-groupoids, <i>Soft Computing</i>, 19: pp. 1–13. (2015), Jakubikova-Studenovska D, Poeschel R, Radeleczki S: The lattice of congruence lattices of algebras on a finite set: <i>ALGEBRA UNIVERSALIS</i> 79:(4) pp. 1–23. (2018)</p>				
<p>Research in mathematics education</p>		<p>[1] Szilvia Árval-Homolya, Szilvia Szilágyi: Learning by playing based on innovative, logical skills developing lesson using Lego, <i>Matematikát, Fizikát és Informatikát Oktatók 42. Országos Konferenciája: MAFIOK 2018</i>. Kecskemét, 2018.08.27-2018.08.29., Gradus, 2018, accepted [2] Szilvia Árval-Homolya, Szilvia Szilágyi: Analysing of advanced final exams in mathematics aspecting of the expected mathematical knowledge level in case of first undergraduate course in information science and engineering. In: <i>Talata István (szerk.) Matematikát, Fizikát és Informatikát Oktatók 41. Országos Konferenciája: MAFIOK 2017</i>. Budapest, Magyarország, 2017.08.24-2017.08.26. Budapest: Szent István Egyetem Ybl Miklós Eötvös Tudományi Kar, 2017, pp. 79–87. (ISBN:978-963-269-663-8) [3] Szilvia Szilágyi, Szilvia Árval-Homolya Zoltán Szarka's Lecture Notes and Handbooks on Mathematics for Engineers In: <i>Körtési Péter (szerk.) Proceedings of the History of Mathematics and Teaching Mathematics Conference. Eger, Magyarország, 2016.05.19-2016.05.22</i>. Miskolc: Junior Mathematical Society Miskolc, 2016. p. xx. (ISBN:978-963-12-5552-2)</p>				
<p>Diophantine equations, Euler polynomials, Bernoulli polynomials, decomposability of polynomials</p>		<p>Á. Pintér, Cs. Rakaczki, On the decomposability of the linear combinations of Euler polynomials, <i>Miskolc Math. Notes</i> (2017) 18, 407-415, Á. Pintér, Cs. Rakaczki, On the decomposability of the linear combinations of Bernoulli polynomials, <i>Monatshette für Math.</i> (2016), 180, 631-648, D. Kress, Cs. Rakaczki, Diophantine equations with Euler polynomials, <i>Acta. Arith.</i> 161 (2013), 267-281, Cs. Rakaczki, On some generalizations of the diophantine equation <math>(1^k+2^k+\dots+x^k)=m^k</math>, <i>Acta Arith.</i> 151 (2012), 201-216, Cs. Rakaczki, On the simple zeros of shifted Euler polynomials, <i>Publ. Math. Debrecen</i> 79 (2011), 623-636</p>				
<p>Mathematical physics Exactly solvable models of statistical mechanics</p>		<p>Graphical solutions of the Yang-Baxter equation with cut strands, <i>J. Knot Theory Ramifications</i> 26 (2017), no. 4, On the solvability of two dimensional semigroup gauge theories <i>J. Math. Phys.</i> 51 (2010), no. 6, 063301, A Yang-Baxter egyenlet néhány megoldásának grafikus reprezentációja. <i>GÉP. LXIII. Évfolyam</i>, 2012. 59., Néhány általánosított Toda rács módosított Lax reprezentációja. <i>GÉP. LXIII. Évfolyam</i>, 2012. 63.</p>				
<p>Applied mathematics: optimization, numerical methods, mathematical statistics, computer sciences. Special subjects: convexity, kernel smoothing, robust estimators, concept lattices, data bases.</p>		<p>Körei A., Using Formal Concept Analysis in the Evaluation Process, <i>Advances in Intelligent Systems and Computing</i>, 2018, pp. 143–149. Tóth T., Radeleczki S., Körei A., Veres L.: A new mathematical method to supporting group technology, <i>European Journal of Industrial Engineering</i>, 8(5), pp. 716–737, 2014. Körei Attila: Applying Formal Concept Analysis in Machine-Part Grouping Problems. In: <i>Applied Machine Intelligence and Informatics (SAMi)</i>, pp. 197–200, 2013. Ganter B., Körei A., Radeleczki S.: Extent Partitions and Context Extensions. <i>Mathematica Slovaca</i> 63(4), pp. 693–706, 2013.</p>				<p>Adaptive data mining systems Simulation-based technology and product development</p>
<p>Beams and beam structures made of heterogeneous materials</p>	<p>The mechanical properties of beams and beam structures made of heterogeneous materials could be more advantageous than beams made of homogeneous materials. Examples for such structural elements are beams made of multi-layered, fiber-reinforced composites or functionally graded anisotropic materials. The main objective of the research performed in this field is to improve the existing beam models, as well as to develop and apply new analytical and numerical models for their reliable computations.</p>	<p>Kiss, L. - Szeidl, Gy.: In-Plane Stability of Fixed-Fixed Heterogeneous Curved Beams under a Concentrated Radial Load at the Crown Point, <i>Technische Mechanik</i> 35(1):31-48, 2015. Lengyel, Á.J. - Ecsedi, I.: Energy methods for curved composite beams with partial shear interaction, <i>International Review of Mechanical Engineering</i> 10(7):508-517, 2016. Kiss, L. - Szeidl, Gy.: Vibrations of Pinned-Fixed Heterogeneous Circular Beams Pre-loaded by a Vertical Force at the Crown Point, <i>Journal of Sound and Vibration</i> 393C:92-113, 2017. Ecsedi, I. - Lengyel, Á.J.: Analysis of Layered Composite Beam with Imperfect Shear Connection by Means of Energy Method, <i>International Journal on Engineering Applications</i> 6(2):42-51, 2018. Kiss, L. - Szeidl, Gy.: On the eigenfrequencies of preloaded rotationally restrained extensible circular beams by Green's Functions, <i>Acta Mechanica</i>, <a href="https://doi.org/10.1007/s00707-018-2285-1">https://doi.org/10.1007/s00707-018-2285-1</a>, 2018.</p>		<p>Some special problems in computational mechanics Contract: NKFI-115701 (2015-2019)</p>		<p>Simulation-based technology and product development</p>
<p>Finite element modeling of contact and wear problems</p>	<p>Efficient mathematical and mechanical models for contact problems of elastic bodies, as well as the prediction of the wear process between contact surfaces are especially important in mechanical engineering. The research in this field is performed in an international cooperation and it involves the development and improvement of the finite element models for the computation of contact and wear problems, and also their application to industrial problems with different geometrical and loading conditions.</p>	<p>Ecsedi, I. - Baksa, A.: Static analysis of composite beams with weak shear connection, <i>Applied Mathematical Modelling</i> 35(4):1739-1750, 2011. Páczelt, I. - Kucharski, S. - Mróz, Z.: The experimental and numerical analysis of quasi-steady wear processes for a sliding spherical indenter, <i>Wear</i> 274–275:127–148, 2012. Páczelt, I. - Mróz, Z. - Baksa, A.: Analysis of Steady Wear Processes for Periodic Sliding, <i>Journal of Computational and Applied Mechanics</i> 10(2):231–268, 2015. Páczelt, I. - Mróz, Z.: Analysis of wear processes for periodic loading, <i>Key Engineering Materials</i> 681:117-141, 2015. Mróz, Z. - Kucharski, S. - Páczelt, I.: Anisotropic friction and wear rules with account for contact state evolution, <i>Wear</i> 396-397:1-11, 2018.</p>		<p>1. GKD 56° Production development of a large-sized ball pivot CI.600 and the numerical simulation of its elastic deformation Partner: DKG EAST Olaj- és Gázipari Berendezéseket Gyártó Zrt. (2011) 2. Development of the production process of a packing tool (aerosol) made by aluminium Partner: Mátremetál Kft. (2018)</p>	<p>Some special problems in computational mechanics Contract: NKFI-115701 (2015-2019)</p>	<p>Simulation-based technology and product development</p>

Boundary element method	s t i t u t e  o f  A p p l i e d  M e c h a n i c s	<p>Szeidl, Gy. - Dudra, J.: Boundary integral equations for plane orthotropic bodies and exterior regions, <i>Electronic Journal of Boundary Elements</i> 8(2):10-23, 2010.</p> <p>Szeidl, Gy. - Dudra, J.: A direct boundary element formulation for the first plane problem in the dual system of micropolar elasticity, Chapter 12 in <i>New Developments in the Boundary Element Method</i>, Editor: V. Murin, Springer-Verlag, pp. 220-256, 2010.</p> <p>The boundary element method is an efficient numerical method for solving boundary value problems in elasticity. When applying the method, the boundary of the domain is discretized into elements and the corresponding integral equations are collocated at nodal points, utilizing the fundamental solution of the governing partial differential equations. The aim of the basic research pursued in this field is to develop new boundary elements for the solution of boundary value problems in elasticity.</p>	<p>Dudra, J. - Szeidl, Gy.: On the direct BEM formulation in the dual system of plane elasticity for orthotropic bodies, <i>Journal of Computational and Applied Mechanics</i> 10(2): pp. 147-168, 2015.</p> <p>Szirbik, S.: Boundary contour method for mixed boundary value problems in the dual system of plane elasticity, <i>Journal of Computational and Applied Mechanics</i> 10(1):65-82, 2015.</p> <p>Szirbik, S.: Hypersingular boundary integral formulations for plane elasticity in terms of first-order stress functions, <i>Journal of Computational and Applied Mechanics</i> 11(1):49-66, 2016.</p>		Some special problems in computational mechanics Contract: NKFI-115701 (2015-2019)	Simulation-based technology and product development
Modeling of structural plates and shells		<p>The development of robust and reliable mathematical and mechanical models for structural plates and shells is one of the toughest challenges in computational and applied mechanics. The accurate prediction of the strength, stability and dynamical properties of such structures is of basic importance in engineering. The main objective of the research performed in this field is to develop new models and finite elements that give rise to reliable solutions and better performance with respect to existing models and elements.</p>	<p>Burmeister, D.: Stability of Shell-Stiffened and Axisymmetrically Loaded Annular Plates, <i>Technische Mechanik</i> 33(1):1-18, 2013.</p> <p>Burmeister, D.: Buckling of circular plates with shell-stiffening on the boundary, <i>Journal of Computational and Applied Mechanics</i> 10(1):3-23, 2015.</p> <p>Bertóti, E.: Comparative study of primal- and dual-mixed finite element models for cylindrical shells, <i>Journal of Computational and Applied Mechanics</i> 10(2):123-146, 2015.</p> <p>Gönczi, D.: Thermoelastic analysis of thick-walled functionally graded spherical pressure vessels with temperature-dependent material properties, <i>Journal of Computational and Applied Mechanics</i> 12(2):109-125, 2017.</p> <p>Burmeister, D.: Asymmetric buckling of shell-stiffened annular plates, <i>International Journal of Mechanics and Materials in Design</i>, Online first, pp. 1-11, 2017.</p>	<p>1. Finite element modeling and development of the scoops of elevator dredgers HM-1, HM-2, HM-3, HM-4 and HM-5 Partner: Mátrai Erdmű Zrt. (2010)</p> <p>2. Development of the production process of a packing tool (aerosol) made by aluminium Partner: Mátramétal Kft. (2018)</p>	Some special problems in computational mechanics Contract: NKFI-115701 (2015-2019)	Simulation-based technology and product development
Multi-field variational principles and finite element models		<p>Multi-field and mixed finite element models are especially important in the numerical analysis of thin-walled structures (beams, plates and shells) and structural components made of incompressible material like rubber. The aim of the basic research pursued in this field is to develop new multi-field variational formulations and mixed finite element models, as well as robust numerical solution procedures that give more accurate and reliable solutions than the classical single-field models and elements.</p>	<p>Tóth, B.: Dual-mixed hp finite element model for elastic cylindrical shells, <i>ZAMM Journal of Applied Mathematics and Mechanics</i> 92(3):236-252, 2012.</p> <p>Tóth, B. - Kocsán, L.G.: Comparison of dual-mixed h- and p-version finite element models for axisymmetric problems of cylindrical shells, <i>Finite Elements in Analysis and Design</i> 65:50-62, 2013.</p> <p>Bertóti, E.: A comparison of primal- and dual-mixed finite element formulations for Timoshenko beams, <i>Engineering with Computers</i> 31(1):99-111, 2015.</p> <p>Tóth, B.: Multi-field dual-mixed variational principles using non-symmetric stress field in linear elastodynamics, <i>Journal of Elasticity</i> 122(1):113-130, 2016.</p> <p>Burmeister, D. - Tóth, B.: Dual mixed axisymmetric shell finite elements using NURBS mid-surface interpolation, <i>Shell Structures: Theory and Applications</i>, pp. 355-358, 2017.</p>	<p>Numerical simulation of the geomechanical behavior of unconventional CH reservoirs Partner: MOL Nyrt. (2008-2013)</p>	Some special problems in computational mechanics Contract: NKFI-115701 (2015-2019)	Simulation-based technology and product development
Coupled boundary value problems in elasticity		<p>The efficient and reliable modeling of the coupled initial-boundary value problems of thermoelasticity, poroelasticity, electroelasticity, etc., is an active research field of emerging importance, internationally. The main objective of the basic and applied research performed in this field is to develop new variational principles and the related finite element models, as well as robust analytical and numerical solution procedures, and their application to problems of industrial interest.</p>	<p>Ecsedi, I. - Baksa, A.: Prandtl's formulation for the Saint-Venant's torsion of homogeneous piezoelectric beams, <i>International Journal of Solids and Structures</i> 47(22-23):3076-3083, 2010.</p> <p>Ecsedi, I. - Baksa, A.: A variational formulation for the torsional problem of piezoelectric beams, <i>Applied Mathematical Modelling</i> 36:1668-1677, 2012.</p> <p>Ecsedi, I. - Baksa, A.: Analytical solution for layered composite beams with partial shear interaction based on Timoshenko beam theory, <i>Engineering Structures</i> 115:107-117, 2016.</p> <p>Gönczi, D. - Ecsedi, I.: Thermoelastic analysis of functionally graded hollow circular disk, <i>Archive of Mechanical Engineering</i> 62(1):5-15, 2017.</p> <p>Tóth, B.: Dual and mixed nonsymmetric stress-based variational formulations for coupled thermoelastodynamics with second sound effect, <i>Continuum Mechanics and Thermodynamics</i> 30(2):319-345, 2018.</p>	<p>Numerical simulation of the geomechanical behavior of unconventional CH reservoirs Partner: MOL Nyrt. (2008-2013)</p>	Some special problems in computational mechanics Contract: NKFI-115701 (2015-2019)	Simulation-based technology and product development
Further development of technological equipment		<p>Development tasks aimed at solving technical problems in industrial companies. These include modernizing equipment control, i.e., switching to a new PLC system and re-programming the technology process. In order to reduce the</p>		Name of the Company: Robert Bosch Elektronika Ltd. (Hatvan, 2008, 2009); Name of the Company: Bosch Rexroth Pneumatika Ltd. (Eger, 2008, 2009)	Title of the Project: Analysis of the SYMAX TT Type Rotating Oven; Title of the Project: Upgrading the PLC Control of the 3426 Hegenscheidt Flow Turning; Title of the Project: Modernization of the PLC Control System of the 9760 Type Ultrasound Washing Machine; Title of the Project: Modernization of the PLC Control System of the 9763 Type Ultrasound Washing Machine; Title of the Project: Redefinition of the	Simulation-based technology and product development
Research and development of starter motors		<p>During the research of starter motors, a new solution has been developed which has also been patented. The patent included the redesign of the switch mechanism. The research also involved measuring and modeling the switch mechanism of conventional starter motors. In this topic a PhD dissertation has been defended.</p>	<p>1. Lajos Nagy – Endre Jakab: Modelling and Simulation of the Pinion-Engaging Mechanism of Starter-Motors, Mechanical Engineering 2008 Budapest 29-30. May 2008. p. 8 (CD) ISBN 978-963-420-947-8 (in Hungarian)</p> <p>2. Lajos Nagy – Endre Jakab: Modelling issues of electromagnetic coupling mechanisms, XXV. National Seminar of Engineers and Product Developers, Nov. 6-7. 2008, GÉP 2008/10-11. LVIII. Vol., pp. 103-106 (in Hungarian)</p> <p>3. Lajos Nagy – Endre Jakab: Dynamic modeling of a Starter, Mechanical, Mechatronic and Safety Symposium, Science Day, BMF, Nov. 14. 2008, p. 8 ISBN 978-963-7154-85-0 (in Hungarian)</p> <p>4. Lajos Nagy – Endre Jakab: Determination of Acceptable Solution Variants for Starter Motors by Traditional Conceptual design Methods, GÉP LXI. 3.szám 2010. ISSN 0016-8572 pp. 35-42.</p> <p>5. Lajos Nagy – Endre Jakab: Development of New Technical Solution for Starter Motors for Passenger Cars, Hungarian Journal of Industrial Chemistry Veszprém Vol 38(2), pp. 127-132 (2010) HU ISSN 0133-0276</p> <p>6. Lajos Nagy – Endre Jakab: Dynamic Analysis of Starter Motor Relay, OGÉ 2011. XIX. International Conference on Mechanical Engineering, Csksomlyó, April 28-May 1, 2011, ISSN 2068-1267, pp.264-267</p>	Name of the Company: Robert Bosch Energy and Body Systems Kft. (Miskolc, 2009)	Title of the Project: Development of a Starter: Designing, Construction and Measurement of a Starter Test Bench	Simulation-based technology and product development
Energy Management		<p>In this research, we first conducted energy management measurements on a refrigerator-heating air conditioner in order to optimally use the company during restarts. On the basis of the calculations, we proposed the appropriate start-up of the system.</p>	<p>1. Lénárt József, Dr. Gyuricza István: Optimization of Climatic Chambers Operation, OGÉ 2011. XIX. International Conference on Mechanical Engineering, pp. 236-239, ISSN 2068-1267 (in Hungarian)</p>	Name of the Company: Robert Bosch Elektronika Ltd. (Hatvan, 2010)	Title of the Project: Energy management of Symax refrigeration and heating equipment	Intelligent production support systems

Vibration measurement	In the framework of the research, an optical vibration measuring device was developed using a line camera. The unit can measure and process transverse vibrations. The central element of the system is an FPGA card that realises a fast Fourier transform in real time and displays the results in graphics.	1. Lénárt, József: Non-contact vibration measurement, XII. Hungarian Mechanical Conference. (2015) ISBN:9786155216749 pp. 1-4. (in Hungarian) 2. Rónai, László: Precision vibration measurements with modernized laser interferometer, Student Research: University of Miskolc Conference of Student Researches, 9 pp. 104-111. , 8 p. (2016) (in Hungarian) 3. Rónai, László: Further Development of a Laser Interferometer Recent Innovations in Mechatronics 3 : 1-2 pp. 1-4. , 4 p. (2016)	Name of the Company: Robert Bosch Elektronika Ltd. (Hatvan, 2011) Line camera for vibration measurement	Title of the Project: Development of Vibration Measurement Method for Comsonic Type Vibrational Plastic Welding Machine	Intelligent production support systems
Rotor Balancing	Within the framework of the research, a rigidly suspended imbalance measurement device has been developed, working at operating speeds. The advantage of this method is to determine the imbalance of plastic rotors capable for deformation due to high centrifugal forces. The device was originally designed to balance the trimmer dam.	1. Ungár, Péter; Szabó, Tamás: Designing a Balancing Machine for a Plastic Rotor pp. 595-600. , 6 p. In: Bodzás, Sándor; Mankovits, Tamás (szerk.) Proceedings of the 5th International Scientific Conference on Advances in Mechanical Engineering (ISCAME 2017), Debrecen, Magyarország: University of Debrecen Faculty of Engineering, (2017) p. 650	Name of the Company: Robert Bosch Power Tool Kft. (Miskolc, 2015.)	Title of the Project: Vibration measurement and vibration reduction of a trimmer	Simulation-based technology and product development
Measuring and calibrating machining equipment	The department has an XL-80 Renishaw laser interferometer that can measure more than 10 meters of motion with close to nanometer accuracy. The tool is mainly used for calibration of machining centers. For the accuracy of the measurement, heat compensating elements are placed on the measured machine. Movement of the slide of machining center can be x and y direction.		Name of the Company: Toolstyle Ltd. (Miskolc, 2015-2018)	Title of the Project: Laser measuring of machining centers (8 Contracts)	Intelligent production support systems
Robotizing a technological process	Within the scope of the research, a grip is developed that is suitable for assembling various work piece types of complex geometry. When designing the gripping geometry, not only the inner surface of the jaws but also the outer surface is designed to fit to the component to be mounted. This topic is related to the execution of hepical assembly operations with a robot assuming snaps-through phenomenon (stability loss).	1. Rónai, László; Szabó, Tamás: Modeling of the Molex 39-01-2040 connector snapfit phenomenon, pp. 352-355. , 4 p. In: OGET 2017: 25th International Conference on Mechanical Engineering, Kolozsvár, Romania: (2017) p. 500 (in Hungarian) 2. Rónai, László: Modeling of the switching phenomenon of electrical switching mechanism pp. 79-84. , 6 p. In: Kovács, László; Piller, Imre (szerk.) Conference of PhD Students, 2016: Section Publications of Department of Mechanical Engineering and Informatics, Miskolc-Egyetemváros, Hungary: Miskolci Egyetem, (2017) 3. László, Rónai; Tamás, Szabó: Designing of Robotic Double-Function Fingertips, Design of Machines and Structures 7: 2 pp. 13-19. , 7 p. (2018)	Name of the Company: Robert Bosch Power Tool Ltd (Miskolc, 2016-2017)	Title of the Project: Feasibility study for welding battery cells with a robot	Intelligent production support systems
Theory of machine tools: Practical and theoretical applications of the theory of mapping of motion information, morphology and the dynamics of machine tools.	Practical and theoretical applications of the theory of mapping of motion information, morphology and structure development of machine tools, dynamics of machine tools (linear and nonlinear analysis of main- and subdrives of machines, analysis of driving-belts), FEM simulation of machine tools (vibrational, thermal).	- Tóth, Dániel; Szilágyi, Attila; Takács, György: Investigation of rolling element bearings using time domain features, LECTURE NOTES IN MECHANICAL ENGINEERING F12 pp. 3-12. , 10 p. (2017), DOI Scopus - Patkó, Gyula; Szilágyi, Attila; Simon, Gábor: Magasabb harmonikusok kizárásának finomítása egy globális lineárisálás esetén pp. 87-87. , In: Baksa, Attila; Bertóti, Édgárd; Szirák, Sándor (szerk.) XII. Magyar Mechanikai Konferencia, Miskolc, Magyarország : Miskolci Egyetem Gépészmérnöki és Informatikai Kar Műszaki Mechanikai Intézet, (2015). - Szilágyi, Attila; Takács, György; Barna, Balázs: Static-stiffness analysis of a roll-bending machine of high-power, KEY ENGINEERING MATERIALS S81 pp. 125-130. , 6 p. (2014), DOI Scopus - Szilágyi, Attila; Patkó, Gyula; Csáki, Tibor; Barna, Balázs: Dynamical investigation of a superfinishing device: Idegen nyelvű konferencia előadás pp. 107-108. In: Boris, Obsieger (szerk.) Proceedings CADAM 2012 : 10th International Conference on Advanced Engineering, Computer Aided Design and Manufacturing, Rijeka, Horvátország : University of Rijeka, (2012). - Szilágyi, Attila; Takács, György; Kiss, Dániel; Tóth, Dániel: Theoretical vibration analysis of a manufacturing device, DESIGN OF MACHINES AND STRUCTURES 6 : 1 pp. 63-71. (2016).	- UBDDA típusú lemezhengertő berendezés vizsgálata, fejlesztési javaslatok kidolgozása - ANDRITZ KFT, 2012 - Az ALCOA-Köfém Kft. székesfehérvári gyárának Hengermű csarnokában üzemelő nagyfejlesztményű tuskomárgépjé üzem részseit feltáró K+F tanulmány elkészítése - ALCOA - KÖFÉM KFT, 2013 - Hengerműi Ebner gyártmányú infra-gázgökök áttervezése - ALCOA - KÖFÉM KFT, 2014	- TÁMOP-4.2.1.B-10/2/KONV-2010-0001 „A felsőoktatás minőségének javítása kiválósági központok fejlesztésére alapozva a Miskolci Egyetem stratégiai kutatási területet”, - TÁMOP-4.2.1.C-14/1/Konv-2015-0012 „Miskolc EgyetemVáros 2015 - A Miskolci Egyetem és Miskolc város összehangolt tudásátrfer és innovációs szolgáltatás fejlesztése és fenntartható partnerség kiépítése stratégiai gazdasági szereplők bevonásával” - TÁMOP-4.1.1.C-12/1/KONV-2012-0002 ”járműipari felsőoktatási és kutatási együttműködés” - EFOP-3.6.1-16-2016-00011 „Fiatalok és megújuló Egyetem – Innovatív tudásváros A Miskolci Egyetem intelligens szakosodását szolgáló intézményi fejlesztése” - GINOP-2.2.1-15-2017-00093, ”Ultrapontosságú és FreeDome típusú szerszámgépek kifejlesztése” - GINOP-2.2.1-15-2017-00086, ”3D HOLOGRAFIKUS KÉPEK RÖGZÍTÉSÉRE ALKALMAS FOTOPOLIMER RENDSZER FEJLESZTÉSE”	1. Erdőenergetikai szerkezetek és integrálásuk, 2. Integrált mérnöki rendszerek a digitális gyártásban, 3. Szimulációra alapozott technológia- és termékfejlesztés
Construction activities of machine tools and their units: automatic chuck-devices, ball-screw drives, development of machines and devices for manufacturing by cutting.	This research field includes the structural design of automatic chuck-devices, ball-screw drives, development of machines and devices for manufacturing polygon-shaped curves and surfaces, theory and design of machine-tool related measurements, residual lifetime assessment of rolling bearing elements.	- Csáki, Tibor; Lajtos, Julanna; Mokó, Ildikó; Szilágyi, Attila: Reverse engineering alkalmazási lehetőségei, GEP 63 : 3 pp. 51-54. , 4 p. (2012) , - Patkó, Gyula; Csáki, Tibor; Simon, Gábor; Szilágyi, Attila: Development of a superfinishing device pp. 131-136. Paper: 122. In: János, Kundrák; Gyula, Varga; István, Deszpoth (szerk.) Proceedings of the Thirteenth International Conference on Tools : ICT 2012, Miskolc, Magyarország : University of Miskolc, (2012) p. 442. , - Szilágyi, Attila; Patkó, Gyula; Csáki, Tibor; Barna, Balázs: Dynamical investigation of a superfinishing device, ADVANCED ENGINEERING 6 : 1 pp. 103-110. (2012) , - Patkó, Gyula; Takács, György; Szilágyi, Attila:Szerszámgyártási és mechanikai kutatások a Miskolci Egyetem Szerszámgépek Tanszékén p. CD. In: Csibi, Venczel-J (szerk.) OGET 2010 - XVII. Nemzetközi Gépészeti Találkozó, Kolozsvár, Románia : Erdélyi Magyar Műszaki Tudományos Társaság (EMT), (2010) , - Patkó, Gyula; Takács, György; Szilágyi, Attila: A new dynamical concept of a superfinishing device driven by a linear motor unit, SCIENTIFIC BULLETIN SERIES C: FASCICLE MECHANICS, TRIBOLOGY, MACHINE MANUFACTURING TECHNOLOGY 22 : 1 pp. 1-8. , 8 p. (2008) .	- Automatikuss pofaleptetésű tokmánycsalád Ø254 mm névleges méretű tagjának korszerűsítő fejlesztése és szervó-rendszerének kidolgozása - SZIMIKRON KFT, 2011 - Gördülőlélelemes hajtású, folytonos osztású NC kórszatal koncepciójának kidolgozása - UNI-FLEXYS KFT, 2011 - Új típusú, nagy emelkedésű, az any falában visszavezetett gölyörsorcsalád 50x25 méretű tagjának kifejlesztése - UNI-FLEXYS KFT, 2010 - Új típusú, az any falában visszavezetett gölyörsorcsalád 50x méretű tagjának kifejlesztése - SZIMIKRON KFT, 2010 - Hengerműi Ebner gyártmányú infra-gázgökök áttervezése - ALCOA - KÖFÉM KFT, 2011	- GINOP-2.3.4-15-2016-00004, ”Korszerű anyagok és intelligens technológiák FIEK létrehozása a Miskolci Egyetemen” - GINOP-2.2.1-15-2017-00093, ”Ultrapontosságú és FreeDome típusú szerszámgépek kifejlesztése” - GINOP-2.2.1-15-2017-00086, ”3D HOLOGRAFIKUS KÉPEK RÖGZÍTÉSÉRE ALKALMAS FOTOPOLIMER RENDSZER FEJLESZTÉSE”	1. Gyártó- és logisztikai hálózatok fejlesztése, 2. Integrált mérnöki rendszerek a digitális gyártásban, 4. Szimulációra alapozott technológia- és termékfejlesztés, 5. Erdőenergetikai szerkezetek és integrálásuk.
Computer Aided Design: computer aided analysis of machine structures and, Computer Aided Simulation of CNC manufacturing process.	This research field includes the theoretical and practical investigations of computer aided analysis of machine structures and, computer aided simulation of CNC manufacturing process, programming of 3D integrated engineering CAD systems, and some issues on the methods of CAD-eduction.	- György, Hegedűs: Application of Knowledge-Based Design in Computer Aided Product Development, LECTURE NOTES IN MECHANICAL ENGINEERING F12 pp. 109-114. , 6 p. (2017), DOI ISBN: 978319511887 Scopus , - Hegedűs, György; Kalmár, László: Knowledge-Based Design of Axial Pump Impeller p. CD. 6. p. In: The 40th International Conference on Mechanics of Solids, Acoustics and Vibrations ICMASV 2016 and The 6th International Conference on “Advanced Composite Materials Engineering” COMAT 2016 Brasov, Románia : University of Transylvania of Brasov, (2016) p. 6, - Hegedűs, György: Newton's method based collision avoidance in a CAD environment on ball nut grinding, INTERNATIONAL JOURNAL OF ADVANCED MANUFACTURING TECHNOLOGY 84 : 5 pp. 1219-1228. , 10 p. (2016). - Hegedűs, György; Takács, György: Applied numerical methods on the determination of grinding tool parameters of ball nuts pp. 52-57. In: Mankovits, Tamás (szerk.) Proceedings of the 1st international scientific conference on advances in mechanical engineering (ISCAME 2013) : 10-11 October 2013, Debrecen, Hungary, Debrecen, Magyarország : Debreceni Egyetem Műszaki Kar, (2013) p. 229 , - Hegedűs, György; Patkó, Gyula; Takács, György: Determination of Tool Profile for Ballnut Grinding by Numerical Methods (2012), 13th International Conference on Tools, ICT 2012, 27-28 March, 2012, Miskolc, Hungary.	- Golyósnnyák futópályájának befejező megmunkálására alkalmas szuperfiniselő berendezés megoldási lehetőségeinek feltárása és egy kísérleti berendezés koncepciójának kidolgozása - SZIMIKRON KFT, 2011 - A megemléző által beszállított mintadarab alapján javaslatotl egy kevésbé berendezés lapátfelületének rekonstrukciójára Reverse-engineering technológia felhasználásával. Megmunkálási stratégia kidolgozása a lapátok CNC megmunkálására, próbaforogással ellenőrzni a kidolgozott CAM technológiát - NORDKRE KFT, 2014 - „PST13 kicsi V4” jármű teherviselő-képességének ellenőrzése numerikus mechanikai módszerekkel - Robert Bosch Power Tool Kft, 2017	- GINOP-2.2.1-15-2017-00093, ”Ultrapontosságú és FreeDome típusú szerszámgépek kifejlesztése” - GINOP-2.2.1-15-2017-00086, ”3D HOLOGRAFIKUS KÉPEK RÖGZÍTÉSÉRE ALKALMAS FOTOPOLIMER RENDSZER FEJLESZTÉSE”	1. Intelligens termelés-támogatási rendszerek, 2. Integrált mérnöki rendszerek a digitális gyártásban, 3. Szimulációra alapozott technológia- és termékfejlesztés.

<p>Hydraulics and pneumatics: analysis of executing elements, analysis of separated fluidmechanical drives, analysis of alternative-current driven hydraulic drives, control processes of pneumatical systems.</p>	<p>This research field involves - most of all - the analysis of executing elements, the analysis of separated fluidmechanical drives, the investigation of alternative-current driven hydraulic drives, control processes of pneumatical systems. Besides, both the theoretical and experimental investigation of hydrodynamic guided units of precise manufacturing systems are also involved by this research field.</p>	<p>- Bencs, Péter; Barna, Balázs; Makó, László; Szabó, Szilárd: <i>Effect of Gap Geometry on Flow Losses</i> pp. 13-18. Paper: D. szekció In: Dr. Bikfalvi, Péter (szerk.) <i>microCAD 2011, D szekció: XXV. International Scientific Conference, Miskolc, Magyarország: Miskolci Egyetem Innovációs és Technológia Transfer Centrum, (2011).</i>  - Barna, Balázs; Molnár, László; Iscenko, A.A.: <i>Kopott csapágházak felújítása fémpolimer anyagok felhasználásával, GÉP 63</i> : 3 pp. 27-30. (2012).  - Ishchenko, A.A.; Grishko, V.P.; Barna, B.; Ishchenko, E.A: <i>Technological bases of use of polymers in case of reconstruction of hydraulic cylinder, Metallurgical &amp; Mining Industry</i> 5 pp. 62-65. (2016).  - Lajos, Abreht; Ferenc, Mészáros; Szilárd, Szabó; Balázs, Barna: <i>Position- and Speed-Dependent, Power-Absorbing Hydraulic Cylinder with Mathematically Predictable Characteristics, LECTURE NOTES IN MECHANICAL ENGINEERING F12</i> pp. 123-131. (2017), DOI MIDRA Scopas.  - Tóth, Sándor Gergő; Tóth, Dániel; Takács, György: <i>Application options of roller and hydrostatic bearings in motor spindles, DESIGN OF MACHINES AND STRUCTURES 6</i> : 2 pp. 79-84. (2016).</p>	<p>- Laboratóriumi mérések végzése speciális hidraulikus elemek átfolyási tényezőjének meghatározásához - UNI-FLEXYS Kft, 2010  - Laboratóriumi mérések végzése speciális hidraulikus elemek átfolyási tényezőjének meghatározásához - UNI-FLEXYS Kft, 2012</p>	<p>- GINOP-2.2.1-15-2017-00093, "Ultrapontosságú és FreeDome típusú szerszámgépek kifejlesztése"</p>	<p>1. Intelligens termelés-támogatási rendszerek,  2. Integrált mérnöki rendszerek a digitális gyártásban,  3. Szimulációra alapozott technológia- és termékfejlesztés.</p>
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