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Vladimir Marascu-Klein

Advances in Production, Automation and Transportation Systems

Proceedings of the 6th International Conference on Manufacturing Engineering, Quality and Production Systems (MEQAPS '13)

Proceedings of the 4th International Conference on Automotive and Transportation Systems (ICAT '13)

Brasov, Romania, June 1-3, 2013

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Plenary Lecture 1

Excel Workbook for Convenient Scheduling of Job-Shop Production Projects

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Abstract: In manufacturing companies, scheduling is a decision-making process for allocating and timing of production jobs to processing resources so that one or more scheduling objectives to be met. The result of scheduling decision is a short-term schedule that states the time each operation of production jobs starts and finishes on allotted resource of production facility. If the production jobs use facility resources in a different order during the same time period, a job-shop scheduling situation does exist. To cope with complicated, time- and resource-constrained job-shop scheduling situations, project scheduling techniques are extensively used in practice. These techniques proved effective for job-shop scheduling problems with complex relationships between operations of jobs and with temporal limits set for the execution of operations and for the availability of processing resources. Despite that many computer-aided scheduling (CAS) systems are advocated to efficiently solve traditional job-shop scheduling problems and project scheduling problems respectively, these systems are either too costly or too functionally-limited to be widely used in production scheduling practice. The scheduling workbook that will be discussed during the lecture is a convenient CAS tool for time- and resource-constrained job-shop production projects. The design and the utilization of scheduling workbook will be described with the help of an example job-shop production project. Concluding remarks will be made on the scheduling solutions delivered by the CAS tool and on its future development.

Brief Biography of the Speaker: Mădălin Catană graduated in 1991 the Faculty of Machine Manufacturing Technology from Polytechnic Institute of Bucharest, Romania. He received his Ph.D. degree in Industrial Engineering from University POLITEHNICA of Bucharest, Romania, in 2002, with a thesis on computer-aided process structure planning and scheduling of machining and assembly processes in machine manufacturing industry. Since 1998 he is lecturer in the department of Machine Manufacturing Technology, Faculty of Engineering and Management of Technological Systems, University POLITEHNICA of Bucharest. His current research interests include manufacturing technologies, production management, modeling and simulation of manufacturing processes and systems, and CAD/CAPP/CAM technologies. He has co-authored more than 40 papers published in Romanian technical journals and proceedings of national and international conferences, and 11 academic books and laboratory guides on production engineering and management, assembly and machining technologies, and computer numerical control programming. He performed researches within 7 national research projects. At present, he is a member of Academic Association of Manufacturing Engineering, of Romanian Association for Economic Engineering, and of Bucharest-Ilfov Development Region Consortium for Education and Professional Partnership.

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Plenary Lecture 2

Study Concerning the Possibilities of Self-Starting of Induction Motors

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Abstract: The phenomena of unexpected significant diminution of voltage on the connecting bars of the induction motors that drive industrial equipments determine their braking, the reduction of speed rotations without stopping them. When voltage recovers, induction motors begins to self-start. Do to the hard circumstances, not all of them can do it. That is why it is very important to know exactly the behaviour of each of induction motor of the group. The paper presents a method of computer analysis of the self-starting conditions providing professionals with a simple and efficient tool of evaluating the self-starting possibilities of induction motors sensitive to voltage drops and allowing them to find accurate technical solutions.

Brief Biography of the Speaker: Flavius Dan SURIANU was born in Timisoara, Romania on April, 2, 1949. He received the B.Sc. and the Ph.D. degrees in electric machines from the Politehnica University of Timisoara, in 1972 and 1987, respectively.
His academic career started in the autumn of 1977 at The Politehnica University of Timisoara where he is a professor in areas of Large Industrial Consumer Units, Identification and Mathematical Modeling of Power System Elements and Electromagnetic Compatibility. Since 2001 he is the head of the Power System Department. He has a remarkable scientific and didactic experience being the author of 16 books and of an E-book chapter, 89 papers published in national and international journals and conference proceedings and 67 research projects, mainly in the fields of transient and long term dynamics of power systems, mathematical models of large consumer units, high voltage and electromagnetic risk, electromagnetic compatibility, energy balances and renewable energies. He is a member of IEEE, CIGRE, AGIR (The General Association of the Engineers in Romania) and IRE - EURELECTRIC (The Romanian National Institute for Energy Development Studies).

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Plenary Lecture 3

A Study on Centerless Grinding

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Abstract: Our goal is to perform a study on the dynamics of the piece in the centerless grinding process. The model constructed in this paper is a high non-linear one, resulted from the geometry of the centerless grinding. For this model we perform the development into Taylor series to obtain the depth of cut as function of the displacement of the piece, as a third degree polynomial. In this form, we get three potential positions of equilibrium for the piece. To avoid two such equilibrium positions (which are unstables) and lead to a mathematical model that uses the Heaviside step function, we determine the geometric condition for the existence and uniqueness of the equilibrium position. We also prove that this unique position of equilibrium is a simply stable one. This condition is one and the same to the condition of existence for the harmonic development of the solution around the simply stable equilibrium position. We determine this solution till the third order harmonic and we present the condition to avoid the secular terms in the solution. In this way we give a theoretical explanation for the triangular shape of the obtained piece by centerless grinding. The study assumed that the cutting force is a linear expression in depth of cut and the piece does not loose the contact to both cutting disc and driven disc.

Brief Biography of the Speaker: Nicolae-Doru Stanescu (born 1965) graduated the Faculty of Machines Construction's Technology at the "Politehnica" University of Bucharest in 1989, and the Faculty of Mathematics and Computer Science at the University of Pitesti in 1995. Since 2003 he is PhD in Mechanical Engineering at the University of Pitesti, and since 2008 he is PhD in Mathematics at the University of Bucharest. Now, he is Associate Professor at the Department of Automotive and Transportation at the University of Pitesti, where he teaches Mechanics, Numerical Methods, Mechanics of System. He wrote more than 200 articles and 10 books, two of them with international publishing houses. He participated as researcher or was director at 8 grants. He is member of the International Institute of Accoustic and Vibration in USA, and of Societe des Ingineurs de l'Automobile, France, among other associations. He was invited professor at Instituto Superior Tecnico, Lisbon, Portugal, and University Tor Vergata, Rome, Italy. His fields of interests are: mechanics of systems, non-linear vibrations, dynamical systems, stability, chaos, and numerical analysis. He is the winner of 'Traian Vuia" prize of the Romanian Academy.

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Plenary Lecture 4

Human Factors Approach in Drilling Rigs Monitoring and Personnel Training

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Abstract: Society rush for energy and information is common knowledge, but must be always room to organize this race especially when natively hazardous processes are on the way. The well known say "No chain is stronger than its weakest link" brings the idea, proven by experience, where human beings are involved, mistakes will be made. That suggests there is no place for low safety zones where dangers for human life and environment safety lies. Productive monitoring of drilling rigs for oil and gas, both for critical and auxiliary equipment, makes a delicate balance between efficiency and safety involving the human factors approach. All harsh environment around the inland and offshore drilling rigs, coming frequently with isolation and additional stress of permanent noise, work in shifts, midnight gas alarms and overall danger, stretches the operator's behavior to limit. These make the human factors even more important for this kind of job where control and solutions are critical for safety of personal and protection of the environment, recent incidents in the offshore rigs proving there are no unnecessary measures taken for good control of the rig and human skills to handle it. Beyond the design of the monitoring system, the personnel training must reflect the importance and care for human factors. Taking the drilling rig monitoring as example, this lecture will present the aspects of human factors in human machine interface design for easy to grasp, easy to control, intuitive system and the modality to take all the benefit of it in the process of personnel training.

Brief Biography of the Speaker: Dr S. D. Grigorescu holds a degree in Electronics and telecommunication (1984) from the University 'Politehnica' of Bucharest (RO) and a PhD in Measurements for Electrical Engineering (1996) from the same university. He started as a scientific engineer at The Institute for Computer Science from Bucharest (1984-1990), and since 1990, he serves at the 'Department of Measurements, Electrical Apparatus and Static Converters' starting as Assistant , Lecturer, Assistant Professor, Professor (2000) and, since 2012, head of the department. He is specialized in Virtual Measurements and Measurement Systems and research interests include: sensors, distributed measurement systems, electrical metrology, signal processing, expert systems, monitoring of power plants and drilling rigs, smart grid and e-learning. He has 26 publications in ISI journals and conference proceedings and 13 patents. He is head of the research teams for several grants and industrial projects in the fields of instrumentation, power quality and integrated control of the drilling rigs.

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Plenary Lecture 5

Strategies Regarding Development of Road Transport to Diminish Greenhouse Gas Emissions

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Abstract: This research paper presents an overview of strategies focused on controlling the greenhouse gas emissions related to motor vehicles and road traffic as to reduce their impacts on the changes of climate. The transport sector is a vital part of the economy and is essential for everyday activities, it is also a significant source of greenhouse gas (GHG) emissions.Transport sector produces a variety of emissions, some of them having a direct greenhouse gas effect as CO2 (mainly), methan (CH4), nitrous oxide (N2O), various hydrofluorocarbons (HFCs) and others, as: NOx, VOC, CO, and O3, having an indirect influence on warming, and particulates (PM). A part of these components have a warming effect, others have a cooling effect that need a careful analysis. As the lifetime of emission components differs, so does their impact on warming and cooling. The international standard is to express greenhouse gases in units of carbon dioxide equivalent, commonly written as CO2e. For a given amount of a greenhouse gas, multiplying the amount of gas by the global warming potential (GWP) for that gas results in the amount of greenhouse gas in terms of CO2e. For automotive-related gases, these global warming potentials(GWP) are: CO2 =1, CH4 =25, N2O =298, HFC-134a =1430.
The greenhouse gas emissions from transport is expected to rise to between 30 and 50%, by 2050 (today it is around 20-25%) and the radiative forcing is expected to increase.
The strategies for medium term (2020) for decreasing of the net greenhouse gas emissions (CO2) can be obtained by using active technologies determined by changing the fuel's nature and characteristcs or by the decreasing of fuel consumption by improving vehicle technologies or/and increasing travel efficiency. Instead, the options for achieving long-term (2050) CO2 emission reductions of 65 to 95% in the transport sector could be: fuel CO2 efficiency; vehicle efficiency; driving efficiency; travelled distance.
Reviewing the long-term targets related to climate changes, then the analysis on fuels becomes very prominent for passenger cars and light vehicles' emission reduction of up to 95%. New fuels should be very low-carbon or zero-carbon fuels, meaning that well-to-tank CO2 emissions are very limited. Thus, a substantial part of the climate mitigation challenge is shifted towards the energy production and refinery sectors. Biofuels constitute a central pillar of sustainable mobility. They have the advantage of not requiring essentially new engines or a new infrastructure, since they can be added to fossil fuels in a controlled form. They can be obtained by using alternative fuels. These alternative fuels can be: methan (NGV); LPG; biofuels as methyl or ethyl esters (biodiesels), biogases (digester gas, wood gas, gas from biomass gasification, .etc.), alcohols from biomass (methanol, ethanol, etc.), vegetable oils, animal fats, etc., or even hydrogen.
Some scenarios of long-term development show combinations of vehicle types and fuel types, as:BEVs batery electric vehicle, PHEVs plug-in hybrid electric vehicles , FCEVs fuel cell electric vehicle, ICEV's hybrids in combination with advanced biofuels.
Heavy-duty vehicles can be divided into long-haul trucks, distribution trucks and buses. CO2 emission reductions of 65 to 95% can be achieved by increasing the efficiency of fuels, vehicles and eco-driving and travelled distance as well.

Brief Biography of the Speaker: Corneliu Cofaru is a full Professor at the Automotive and Engine Department within the Mechanical Engineering Faculty from Transilvania University of Brasov, Romania. His area of expertise is the environmental aspects of internal combustion engines. He authored or co-authored over 240 scientific papers published in reviewed journals or presented at international conferences organized by FISITA, EAEC, SIAR, WSEAS etc. He wrote as author and co-author 26 books. Two of these are written in English and are entitled: "Materials-Energy Sustainable Development" published in 2002 and „Transport and Environmental Engineering" published at the Transilvania University Publishing House in 2007. He had the opportunity to manage international projects in Tempus and Leonardo da Vinci frame and he is a member of Romanian society of automotive engineers.

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