Association for Machines and Mechanisms News Bulletin

Volume 8, No. 4 October 2016

Message from the Editor-in-Chief

Due to some busy schedule of the Zonal Vice-President and the Editor-in-Chief, publication of the Bulletin of the Association of Machines and Mechanisms (AMM) volume 8, No. 4, October 2016 is somewhat delayed. I heartily wish you all a prosperous New Year 2017.

Dr. Shital S. Chiddarwar (Zonal Vice President- West) and her team of researchers and students have extended active support to bring out this issue. Dr. G. Saravana Kumar, Secretary AMM, Dr. C. Amarnath, President AMM and other office bearers of AMM have also given background support for this issue.

On last few occasions, Dr. Shital S. Chiddarwar wrote an Editorial and wished the same be published in the name of the Editor-in-Chief. She wishes to do the same for this issue as well. However, I wish to publish the proposed Editorial as a Message from the ZVP (West) with some editing. Hope she won't mind in accepting this *'misdeed'* of the Editor-in-Chief. I sincerely thank her to take pains to co-edit this issue.

There are one contributed article and two short review articles in this issue. Title of the contributed article is **"Design and Development of a Pellet Mill Energized by Human Powered Flywheel Motor"**. Articles based on review are on **"Sliding Mode Control"** and **"Application of bond graph on system modelling".**

AMM members are requested to contribute articles and send same to the editorial team for January 2017 issue. Constructive suggestions, comments for improvement in the Bulletin of the AMM are sincerely requested. On behalf of the Editorial Team of the Bulletin of AMM, I sincerely acknowledge the role of office bearers and Editorial Board members in bringing out this issue of the bulletin.

Wish you all a Very Happy New Year 2017!

Prof. Santanu Das
Editor-in-Chief

Our Objectives and Activities

The main objective of AMM is to contribute to mechanical design at all levels starting from academic research to industrial initiatives, thereby enhancing the quality and reliability of indigenous machines. With this in view, AMM organises the International & National Conference on Machines and Mechanisms, iNaCoMM, and the workshops on Industrial Problems on Machines and Mechanisms, IPRoMM regularly.

Inside This Issue

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Message from the Zonal Vice President (West)

The Volume 8, No. 3 was successfully published online by the Editor-in-chief Prof. Santanu Das for the AMM. The current Volume 8, No. 4 is coming from the Zonal Vice President (West).

This issue consists of three articles. The first article is based on research work of **Yashwant Sonkhaskar** from Shri Ramdeobaba College of Engineering and Management, Nagpur with the title, **"Design and Development of a Pellet Mill Energized by Human Powered Flywheel Motor"**. The other two articles are review articles by Ph.D. scholars of VNIT, Nagpur named, **Mr. Saumya Ranjan Sahoo** and **Mr. Veer Alakshendra**.

Dr. G. Saravana Kumar, Secretary, AMM and Prof. C. Amaranth President AMM and other office bearers of the AMM have cooperated and supported as always.

AMM members are requested to contribute articles and send the same to the editorial team. Any constructive suggestion or comments to improve the Bulletin of the AMM are most welcome.

On behalf of the Editorial Team of the Bulletin of the AMM, I heartily thank all concerned for their active support to make this endeavor a success.

Wish you all Happy Seasons' Greetings!

Dr. Shital S. Chiddarwar
ZVP (West)

About the Association of Machines and Mechanisms (AMM)

AMM headquarters are currently located at the Department of Engineering Design, IIT Madras. A new set of office bearers have taken charge of the affairs of AMM. AMM invites both individual and corporate membership from Indian academia, research organizations and industry. Membership benefits and other information about AMM are available at www.ammindia.org. The body of Zonal Vice Presidents (ZVPs) is active over the past several years with representations from the four corners of the country. They are playing the role of nodal agencies so as to decentralise the AMM official activities and to organise workshops under the aegis of AMM to popularise the mechanism science in their respective regions. They also form the editorial team of this news bulletin. AMM invites contributory articles from its members and others working in the various fields of mechanisms science for this quarterly news bulletin. Interested people can contact the editorial team.

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Experience is a hard teacher because she gives the test first, the lesson afterwards.

--- Vernon Saunders Law

Design and Development of a Pellet Mill Energized by Human Powered Flywheel Motor

Y. M. Sonkhaskar, Dr. V. S. Deshpande and Dr. J. P. Modak
Shri Ramdeobaba College of Engineering and Management, Nagpur-440 013,
Maharashtra, India

ABSTRACT

Wood pellets are a type of wood fuel, generally made from compacted sawdust. They are usually produced as a by product of saw milling and other wood transformation activities. The pellets are extremely dense and can be produced with a low humidity content (below 10%) that allows them to be burned with very high combustion efficiency. Wood pellets have increased tremendously in popularity as a heating fuel during recent years. The present work reports, investigation and performance analysis of a pelletizer energized by human powered flywheel motor. The experimental setup is fabricated to maximize the production rate and density of pellets and to minimize the mean and instantaneous resisting torque. Sufficient data is generated based on experiments conducted using different die thickness, different diameter of holes in the die, (pellet diameter) different die speeds, different binder and moisture content. On the basis of experimental data, the mathematical models are formulated for production rate, density of pellets, mean resisting torque and instantaneous resisting torque. These models are optimized, their sensitivity, reliability, limiting values of independent Π terms and dependent Π terms are analyzed and the models so established are also validated by ANN simulation. The results obtained by experimentation, mathematical models generated and ANN simulations are found in good agreement. Since there is a power shortage in countries like India, there is a need for human powered process machines and hence (manually driven) human powered flywheel motor driven pellet mill (pelletizer) is fabricated. This machine is economically viable and environmentally friendly and can be operated by a un-skilled worker. This equipment can adequately replace electrically driven small capacity pellet machine in rural areas, where there is no or limited supply of electricity. The findings of this research are helpful as an input to design the small capacity human powered flywheel motor energized pelletizer, with an aim to improve the performance. The actual photograph of the experimental set up of a pellet mill energized by human powered flywheel motor is shown in the following figure.

REFERENCE

[1] Y.M. Sonkhaskar, V.S. Deshpande and J.P. Modak, Mathematical modeling of pellet making process using human powered flywheel motor, Industrial Engineering Journal, Vol. VIII, No.11, pp.6-10, 2015.

Sliding Mode Control

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In real world problem, while using a controller there is always a gap between the actual system and its mathematical model. These gaps are the result of unknown uncertainties, external disturbances which can be included in the mathematical model. Thus, derivation of a robust control law in the presence of known and unknown uncertainties is in high demand for various applications. One most common approach for robust controller is sliding mode control technique which was proposed in late 1970s. It is a variable structure control law in which a discontinuous control law is used to control the system against parametric uncertainties. The advantage of this robust technique is it's insensitivity to uncertainties and external disturbances, because of which it is used is various applications such as robotics, aerospace, manufacturing plants etc. Sliding mode control is one of the powerful techniques to control a dynamic system subjected to the uncertainties and external disturbances where the trajectories of the system are bought on the sliding surface and a switching function is applied to ensure that these system trajectories stays on the sliding surface after approaching the reaching phase. To design a sliding mode control law, various steps are involved. First, a sliding function is selected. Then, equivalent control law is derived using ideal sliding mode condition. However, the system remains sensitive to the uncertainties. Thus, in the last stage a switching control law is included to counter the counter the effects of these uncertainties. In addition to insensitivity to uncertainties, the system acts as a reduced order system compared to the real plant.

However, the major drawback of this approach is that high switching gain leads to high frequency control action. This results in excitation of unmodeled dynamics which results in high oscillations, causing damage to the actuators. Thus, to control the chattering effect various modifications have been made in recent years, such as, adaptive sliding mode control, boundary layer approach, higher order sliding mode control etc.

REFERENCE

[1] V. Utkin, J. Shi, Integral sliding mode in systems operating under uncertainty conditions, Proceedings of the 35th IEEE Conference on Decision and Control, vol. 4, pp. 4591-4596, 1996.
[2] J. Slotine, W. Li, Applied Nonlinear Control, Prentice-Hall Pub., New Jersey, 1991.
[3] Alakshendra, Veer, and S.S. Chiddarwar, Design of robust adaptive controller for a four wheel omnidirectional mobile robot, Proceedings of the IEEE International Conference on Advances in Computing, Communications and Informatics (ICACCI), 2015.

Application of Bond Graph on System Modelling

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1. INTRODUCTION

Bond graph is a graphical language for representation of physical system in multi-energy domain through exchange of power. The idea of bond graph was proposed by H.M. Painter and Prof. Amalendu Mukherjee of IIT Kharagpur worked extensively in bond graph modelling in India [1]. Bond graph displays both energy and power exchange between components and elements inside a system by simple line called bond and symbols. By using bond graph modelling technique many field of engineering science can be described by few standard symbols. It bridges the gap between control engineering and part of engineering science by proper dynamic modelling of the system. The recent advent of modern tool box like 20-Sim, Computer aided modelling program (CAMP-G), and MATLAB SIMULINK BG_V20 allow to exploit the bond graph modelling technology.

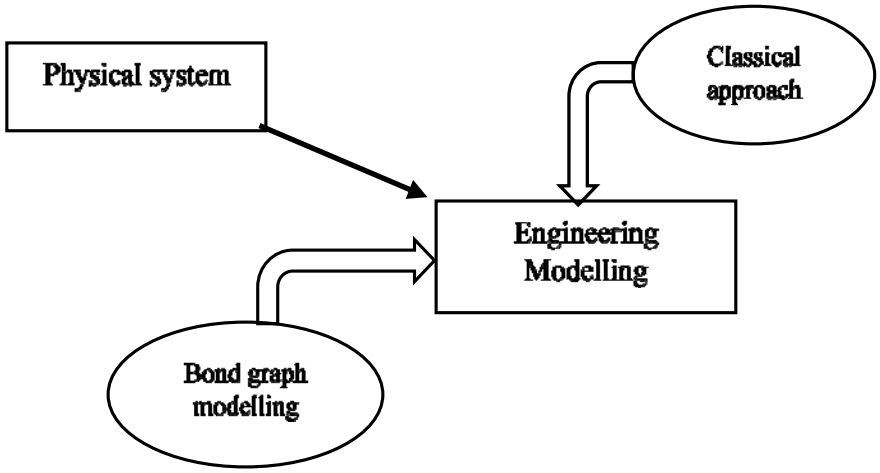

Figure 1 Steps in Design of Dynamic Systems

2. MODELLING THROUGH BOND GRAPH

To model the physical system by bond graph technique, it needs to understand the physical relation among the elements and energy exchange among a system. The complete process of obtaining the bond graph of a system describe briefly. Identify the various physical domains present in a physical system. In each domain identify the different component like resistive, inductive, capacitive and various input source elements present inside the system. Depend upon how they relate with each other connect them with a bond and give the causality (direction of power flow) as shown in figure 2. Each bond is connecting with each other by junctions. Combine all sub-domains to get the complete physical system. To get the mathematical from the graph, junction equations are applied at each junction in the bond graph.

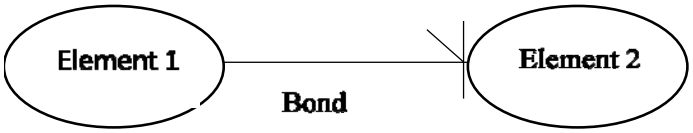

Figure 2 Energetic connection represented by bond graph

The obtained dynamic model of a physical system from bond graph technique can also be used further for control propose, navigation and fault detection in a physical system. Bond graph is an alternate way to deal with variety and diversity in a conceptual unification platform.

3. APPLICATION

The application of bond graph is expanded in all most all fields of engineering. It extensively used by the aerospace industry to modelling of air vehicles and many automobile industries use this for modelling of hybrid vehicles. It also used by many thermal science researchers to model system like boiler, steam expansion system and condenser. Recently people extended this technique in robotic science and various chemical processing plants. Now bond graph modelling and simulation technique regarding theory, methodology, software and control & automation related application is extensively used in both academia and industry.

4. ADVANTAGE OVER CLASSICAL APPROACH

- Make simpler to build a model for multi-disciplinary system.
- The graphically introduced model can generate automatically the dynamic model, no further mathematical analysis required.
- Modular facilitate of Bond graph facilitate to modify or replace sub model without changing the global structure.

5. LIMITATION

Model a system by bond graph need to understand the physical meaning of every element in a system, lack of knowledge regarding the physical structure may deceive the dynamic model.

REFERENCES

[1] Bond graph, https://en.wikipedia.org/wiki/Bond_graph
[2] Bond Graphs - 20-Sim, http://www.20sim.com/product/bondgraphs.html

7th IFToMM International Workshop on

Computational Kinematics (CK2017)

Futuroscope-Poitiers, France, May 22-24, 2017

CALL FOR PAPERS

CK2017 aims to bring together researchers from the broad range of disciplines related to Computational Kinematics in an intimate, collegial and stimulating environment, where they can present and exchange their newest scientific results. The CK2017 Workshop is one of the activities of the IFToMM Technical Committee for Computational Kinematics. The previous sites of this Workshop series were Schloss Dagstuhl (1993), Sophia Antipolis (1995), Seoul (2001), Cassino (2005), Duisburg-Essen (2009) and Barcelona (2013).

Topics : Papers are solicited on topics related with Computational Kinematics, including but not limited to:

- Kinematic design and synthesis
- Computational geometry in kinematics
- Motion analysis and synthesis
- Theory of mechanisms
- Mechanism design
- Kinematical analysis of serial and parallel robots
- Kinematical issues in biomechanics
- Molecular kinematics
- Kinematical motion analysis and simulation
- Geometric constraint solvers
- Deployable and tensegrity structures
- Robot motion planning
- Applications of computational kinematics
- Education in computational kinematics
- Theoretical foundations of kinematics

Contributed Papers: Original papers must be submitted in PDF format. Manuscript templates are available on the conference website. Only papers for which at least one author has registered for CK2017 prior to final submission will be accepted for the conference and be included in the proceedings. Accepted papers will be published after the workshop by Springer in an edited book.

Registration fees

Registration fees include admission to technical sessions, coffee breaks, welcome drink, banquet, and conference proceedings. The registration fees are:

	Before April 1st, 2017	Standard Rate
Regular (IFToMM MO)	400€	450€
Regular (non MO)	450€	500€
Student (IFToMM MO)	300€	350€
Student (non MO)	325€	375€

http://iftomm-ck2017.sciencesconf.org/

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University of Poitiers, France

Important Dates:
Paper submission :
December 31st, 2016
Notification of acceptance :
February 6th, 2017
Final version submission :
February 15th, 2017

AzC IFToMM INTERNATIONAL SYMPOSIUM ON MECHANISM AND MACHINE SCIENCE (ISMMS – 2017)
Baku, Azerbaijan, September 11-14, 2017

CALL FOR PAPERS

Organized by

Azerbaijan Committee of International Federation for the Promotion of Mechanism and Machine Science (AzC IFToMM),

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Azerbaijan Technical University (Department of Theory Mechanism and Machine, Mechanical Engineering Science Center),

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Aim

The aim of the **ISMMS 2017** is to attract scholars, researchers, teachers, students, professionals and other groups interested in the promotion of science of mechanisms and machines, to submit their scientific work in our Symposium. The number of scientific works in the field of MMS grows in the world every year. Potential speakers are invited to submit papers for oral, poster or the video-presentations about new research and theoretical contributions in mechanism and machine science area.

Topics

Computational kinematics
Synthesis of mechanisms
Gear drives and transmissions
Dynamics of machinery
Reliability of machines
Tribology
Mechatronics
Manipulators and robots
Oil-field machines and mechanisms
Technological machines
Transport vehicles

Submission, presentation and publication

Authors are invited to submit a full paper of max. 8 pages through the submission system at the symposium website. The official languages of the Symposium are English, Azerbaijani and Russian. Each paper will be reviewed by the members of the Scientific Committee. All accepted articles will be published in the scientific journal Machine Science (ISSN 2227 – 6912), and also in scientific proceeding of the Symposium with ISBN, and also with the modified version the selected papers will be published in scientific journals of IFToMM.

Deadlines

Full Paper Submission – 01.02.2017
Acceptance of notification – 30.04.2017
Final paper submission – 31.05.2017

Registration

The registration fee includes the complete program of the symposium and the proceedings.

Registration fees before 31.08.2017:

IFToMM Members – 200$
Non IFToMM Members – 250$
Students/Accompanying – 150$

Venue

The Symposium will be held in the Azerbaijan Technical University, Baku.

Accommodation

The Capital of Azerbaijan, Baku has several hotels of different categories. A list of hotels will be posted on the symposium website.

Young Delegates Program (YDP)

4-6 young participants will be supported by IFToMM. For details of YDP: http://iftomm.net/

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Symposium Website:

http://ismms2017.aztu.edu.az/ismms2017/

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STUDENT MECHANISM DESIGN CONTEST

One of the key objectives of the Association for Machines and Mechanisms (AMM) is to promote innovation among the students. A mechanism design contest has been made as an integral part of iNaCoMM, since 2009. The purpose of the competition is to encourage the students to apply their theoretical knowledge in the domain of mechanisms and machines to solve problems relevant to the society.

Details available in the conference web portal: www.inacomm2017.org

REGISTRATION FEE

	Delegates from	India (INR)	Others (USD)
1.	Students & Full time Research Scholars	1500	100
2.	Academic & Research Organizations	3500	250
3.	AMM or IFToMM Members	3000	200
4.	Others	5000	300

IMPORTANT DATES

Authors are invited to submit a two-page extended abstract as per the schedule given below and the guidelines available in the conference website.

Submission of Abstract	May 15th, 2017
Acceptance of Abstract	May 31st, 2017
Submission of Full Paper	July 15th, 2017
Notification of provisional decision & Reviewer comments	Oct. 2nd, 2017
Final submission of Camera-Ready Paper after addressing reviewer comments	Nov. 15th, 2017
Registration	Nov. 15th, 2017

VENUE

DAE Convention Centre
Anushaktinagar,
Mumbai-94

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3rd International and 18th National Conference on Machines & Mechanisms

iNaCoMM 2017

December 13-15, 2017

Organized by

Division of Remote Handling & Robotics
Bhabha Atomic Research Centre
Mumbai

FIRST CALL FOR PAPERS

www.inacomm2017.org

INVITATION

The Division of Remote Handling & Robotics, BARC is organising 3rd International and 18th National and Conferences on Machines and Mechanisms during December 13-15, **2017** (iNaCoMM 2017) at Anushakti Nagar, Bhabha Atomic Research Centre, Mumbai, India.

iNaCoMM 2017 is the 18th National and 3rd International conferences on Machines and Mechanisms organized under the aegis of AMM and IFToMM. The conference aims at bringing together researchers, industry experts and students, working on various aspects of design and analysis of machines, mechanisms and robotics, to deliberate through oral, poster and design contest presentations on recent, novel advances.

iNaCoMM 2017 will feature eminent researchers from India and overseas, as plenary speakers. Each day there will be plenary talk by an eminent scientist followed by interesting morning and afternoon presentation/poster sessions on the topics of the conference. The iNaCoMM 2017 will also host Mechanism Design Contest for Students. There will be recreational performances, music and dance nights are also planned from troops of Art & Culture Associations.

Mumbai and its surroundings are famous for world heritage monuments, art and cultural museums, beautiful hill stations, beaches and islands. Mumbai is a financial capital of India and the famous Bollywood, the Indian Film Industry dwell here. The city offers a cosmopolitan and diverse lifestyle with variety of food and entertainment. During December the climate in Mumbai is generally pleasant. The city is well connected to the various parts of the country by roadways, by railways and by airways. The important tourist places like Ajanta, Ellora, Goa and many west coast beaches, are easily reachable with multiple transport options. The international airport offers direct flight to the various destinations of the world. We hope that besides the enriched scientific flavour of the Conference, you will also enjoy the verdant campus of Anushakti Nagar during your stay.

The Organizing Committee of the Conference extends its invitation to researchers working on the topics of the conference.

SCOPE OF THE CONFERENCE

The scope of iNaCoMM 2017 are, but not limited to, the following topics:

Theoretical and Computational Kinematics:
Analysis, Synthesis, Design, Modelling and Simulation of Mechanisms or Machines.

Robotics:
Robot Kinematics and Robot Dynamics, Serial and Parallel manipulators, Master-Slave Manipulators, Telerobotics, Industrial Robots, Service robots, Autonomous robots, Collaborative and Cooperative Robotics, Distributed and Cloud Robotics, Internet of Robotics, Walking Robots and Humanoids, Wheeled Mobile Robots, Autonomous Vehicles, Swarm and Flying Robots, Under-Water Robotics, Space Robotics, Application of Robotics in Nuclear industry, Hazardous material handling, Decommissioning, Robot applications in Agriculture, Defense, Medical & Surgical Robotics, Wearable Robotics.

Machine and Mechanism Intelligence:
Mechatronic Systems, Automation for Machine Tools, Manufacturing Automation, Process Automation, Machine Learning and Artificial Intelligence, Virtual Reality, Haptics, Telepresence, Human-Machine Interfaces and Interactions, assistive, and rehabilitative technologies.

Mechanisms & Devices:
Compliant Mechanisms, Micro-Nano Machines and Mechanisms, Biologically inspired mechanisms, Bio-medical devices, Mechanisms and Machines for Rural Applications and Agriculture.

Design & Manufacture:
Origami-Based Engineering Design, Image and 3D-Print based Modeling and Manufacturing.

Dynamics of Machinery:
Dynamics and Vibration Analysis in Machines, Fault Diagnosis and Health Monitoring, Dynamics and Control of Multi-body Systems.
History and Future trends: In Machines, Mechanisms and Robotics.

BEST PAPER AWARDS

Two Best Paper Awards, one in general category and other in student category will be handed over by the Association for Machines and Mechanisms. Both awards carrya cash prize along with a citation.

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www.inacomm2017.org

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iNaCoMM 2017

December 13-15, 2017

www.inacomm2017.org

SMDC

Student Mechanism Design Contest

Objective:

One of the key objectives of the Association for Machines and Mechanisms (AMM) is to promote innovation among the students. A mechanism design contest has been integral part of iNaCoMM since 2009. The purpose of the competition is to encourage the students to apply their theoretical knowledge in the domain of mechanisms and machines to solve problems relevant to the society.

Eligibility:

Participation is restricted to individuals/groups of students (up to three members), who should be registered as full-time students/research scholars/project staff in recognized institutes.

Participation:

Participants are invited to submit proposals for design, construction and operation of mechanisms which are innovative and capable of solving a challenging design problem. The design problem may be chosen from a wide range of application domains - from agricultural and rural technology to automobile and aerospace engineering.

Guidelines:

- Participants must submit a 2-page proposal outlining the design challenge and novelty/innovation of the proposed design. The proposals have to be submitted through email, with the subject line **"Proposal for the Student Mechanism Design Contest"** to the email address: inacomm2017@barc.gov.in
- The winner will be decided based on the extent of innovation, difficulty of the design challenge, effectiveness of the proposed solution towards solving the actual problem etc.
- In any matter related to the contest, the decision of the judges and/or the organisers will be final and binding.
- Finished prototypes are to be demonstrated during iNaCoMM 2017 (December 13 - December 15, 2017) before a panel of judges.
- The finalists will be provided with TA/DA.

- **1st Prize: ₹10,000**
- **2nd Prize: ₹6,000**
- **3rd Prize: ₹4,000**

All participants will be awarded with Certificates from AMM

Important Dates

- **Submission of Proposal - 25th September, 2017**
- **Result of 1st Round Elimination - 10th October, 2017**
- **Submission of Detailed Design - 10th November, 2017**
- **Result of 2nd Round Elimination - 20th November, 2017**
- **Demonstration by Finalist - 13th-15th December, 2017**

3rd International and 18th National Conference on Machines & Mechanisms

IFToMM

Organized by

Division of Remote Handling & Robotics

Bhabha Atomic Research Centre Mumbai

Advances in Robotics (AIR 2017)

3rd International Conference of Robotics Society of India
June 28-July 2, 2017
Indian Institute of Technology Delhi, New Delhi, India

SECOND CALL FOR PAPERS

Advances in Robotics (AIR) is a series of biennial conference organized by the Robotics Society of India. The conference aims to create a forum to present and exchange new ideas by researchers and developers from India and abroad working in the fields of robotics and its applications. The conference would have plenary talks, oral and poster presentations, and special industry oriented sessions.

AIR 2017, will be held at IIT Delhi, New Delhi, during June 28-July 2, 2017. The previous two editions of AIR were held at R&DE, DRDO Pune (AIR 2013) and BITS Pilani Goa Campus, Goa (AIR 2015). The conference website is http://www.advancesinrobotics.com

Contributed Papers

The organizers of the conference invite unpublished research work in the following fields of Robotics (representative and non-exhaustive):

- Kinematics, dynamics, control and simulation of autonomous intelligent systems
- Design of robotic mechanisms
- Man-machine interface and integration
- Robotics-related computer hardware, software, and architectures
- Navigation of Unmanned vehicles – ground, aerial, underwater
- Machine learning and artificial intelligence for robotics
- Bio-mimetic and Bio-inspired Robotic Systems
- Vision and other non-contact sensory systems
- Tactile and other contact sensory technology
- Active sensory processing and control
- Medical and Assistive Robotics
- Swarm Robotics
- Humanoid Robots
- Safe Robots
- Robotic Hand
- Virtual Reality & Haptics
- Tele-robotics

Plenary Talks

The following plenary/keynote speakers will be giving a talk:

- Prof. Peter Corke, QUT, Australia
- Prof. Nancy Amato, Texas A&M Univ, US
- Prof. Burkhard Corves, Aachen Univ, Germany

Workshop and Tutorials

A full day workshop and/or tutorials will be held during the conference. The details on the workshop would be made available on the conference website.

Doctoral Symposium

A symposium will be held for the PhD students working in all areas relevant to robotics. It would provide an opportunity to showcase their ongoing research work and interact with experts in the field. More details on the conference website.

Submission Instructions

Research papers have to be submitted in double column ACM format. There is a maximum page limit of 6. The submitted papers will undergo peer-review process. The template and instructions are available on the conference website.

Proceedings

All the accepted papers, after incorporation of the reviewers comments, will be published by ACM.

Important Dates

Full Paper Submission Deadline: **Feb 1, 2017**
Announcement of Results: April 10, 2017
Camera Ready Version: May 5, 2017
Doctoral Symp. Deadline: May 5, 2017
Doctoral Symp. Results: May 25, 2017
Conference: June 28- July 2, 2017

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Proceedings:

Published by ACM

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http://www.advancesinrobotics.com

XII IPRoMM National Workshop
on
Industrial Problems on Machines & Mechanisms

DESIGNING CHALLENGES

PARTICIPATE IN THE CHALLENGE & EXHIBIT YOUR CREATIVITY

Win Cash Prizes upto Rs. 30,000/- & Attractive Gifts

Hurry!!! Last Date 01.12.2016

IPRoMM-2016
is pleased to announce the
DESIGNING CHALLENGES
to be held at
VNIT Nagpur
during
December 22-23, 2016.

The competition is aimed to challenge your creativity for providing solutions to the following industrial problems.

[For details, please visit www.ipromm2016.org]

CATEGORY 1 1st prize - Rs.10,000/-

Challenge 1 : To develop analytical method for predicting accurate noise level of industrial fans for site condition.

Challenge 2: To design efficient cleaning arrangement for air cooled condenser with ease in operation and optimum cost.

Challenge 3: A better cost effective solution for Cleaning of Panels with minimum human intervention & minimum water consumption needs to be found out which will be cost effective & efficient.

CATEGORY 2 1st prize - Rs.10,000/-

Challenge 1 : Design and Optimization of Chassis for Hydraulic Service Trolley (HST) for Su-30 aircraft.

Challenge 2: Design, Analysis and Validation of Hydraulic Systems of Hydraulic Service Trolley (HST) for Fighter Aircrafts.

Challenge 3: Design and Development of Close Loop Electrical Feed-back System for Engine Preservation Unit

CATEGORY 3 1st prize - Rs.10,000/-

Challenge 1 : To design cost effective solution of quench oil management system; for maintaining oil properties to deliver part within specified limit consistently.

Challenge 2: Gear manufacturing company having large Heat treatment facility for processing parts include continuous and batch type furnaces. Develop a solution through predictive, preventive and shutdown maintenance for their sustainable performance to meet desired quality levels consistently.

FEATURES

1. Submit your solutions in the MS-WORD Template available on IPRoMM-2016 website [Maximum Pages : 5] to the email id. impromm2016@gmail.com. Last date of Submission of Entry: 1 December 2016
2. You can provide solutions for multiple challenges. However, separate document should be submitted for each challenge.
3. Register separately for this event by paying Rs.250/-. Last date of Registration: 5 December 2016
4. The selected entries will be given chance to present solutions on 22.12.2016 and jury from industries as well as academia will judge the effectiveness and viability of the solution.
5. The results for the Challenge will be declared on the same day and prizes will be distributed on 23.12.2016.

PRIZES ARE SPONSORED BY VARIOUS INDUSTRIES. THE DECISION OF THE JURY WILL BE FINAL. IN THE EVENT IF THERE IS TIE AMONGST THE TEAMS, THEN CASH PRIZE WILL BE DIVIDED EQUALLY BETWEEN THE TEAMS.

Visit www.ipromm2016.org

Organized by
Department of Mechanical Engineering
Visvesvaraya National Institute of Technology, Nagpur

Under the Aegis of
Association for Machines & Mechanisms

XII IPRoMM

National Workshop

on

INDUSTRIAL PROBLEMS ON MACHINES & MECHANISMS

"Challenges in Manufacturing"

Organised by

Department of Mechanical Engineering
Visvesvaraya National Institute of Technology, Nagpur

Under the Aegis of

Association of Machines & Mechanisms

December 22-23, 2016

REGISTRATION

Last Date of Registration
1st December 2016
Research Scholars/ Students
Rs. 1500/-
AMM Members
Rs. 3000/-
Non AMM Members
Rs. 4000/-
Industry Participant
Rs. 6000/-

SCOPE OF THE WORKSHOP

The workshop broadly covers following topics
Layered Manufacturing / Advanced Manufacturing
CAD/CAM/CNC
Biomedical Engineering
Aerospace Technology
Unconventional Energy
Robotics and Automation
Fluid Machines
Mechatronics
Materials Engineering :
Nano materials & composites
Basic Mechanical Designs
Design of Mechanisms & Machines

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For Paper Presentation & updates visit : www.vnit.ac.in , www.ipromm2016.org

Address for correspondence

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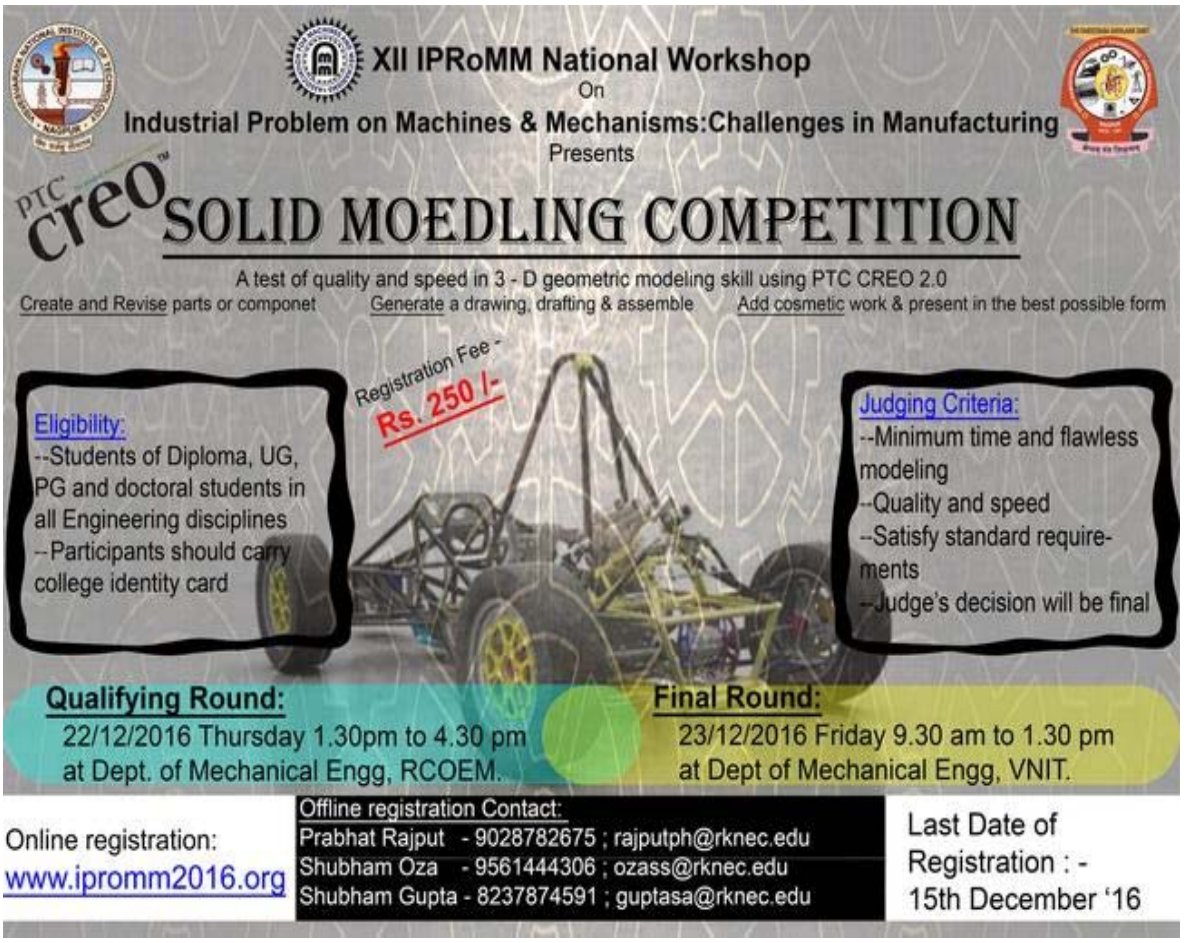
Department of Mechanical Engineering
Visvesvaraya National Institute of Technology, Nagpur-440010
Email : ipromm2016@gmail.com, Website: www.ipromm2016.org, Phone no: +91-712-280 1163/1167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Eligibility:
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--Participants should carry college identity card
Judging Criteria:
--Minimum time and flawless modeling
--Quality and speed
--Satisfy standard requirements
--Judge's decision will be final
Qualifying Round:
22/12/2016 Thursday 1.30pm to 4.30 pm
at Dept. of Mechanical Engg, RCOEM.
Final Round:
23/12/2016 Friday 9.30 am to 1.30 pm
at Dept of Mechanical Engg, VNIT.
Online registration:
www.ipromm2016.org
Offline registration Contact:
Prabhat Rajput - 9028782675 ; rajputph@rknec.edu
Shubham Oza - 9561444306 ; ozass@rknec.edu
Shubham Gupta - 8237874591 ; guptasa@rknec.edu
Last Date of Registration : -
15th December '16

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