



6th International and 21st National Conference on Machines and Mechanisms

(iNaCoMM 2023)



MECHANICAL ENGINEERING DEPARTMENT - NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR
07-09 December 2023

SCHEDULE - iNaCoMM 2023

7th December, 2023; 08:45 AM – 09:30 AM

Spot Registration for Participants

7th December, 2023; 09:30 AM – 10:30 AM

Inauguration Ceremony

7th December, 2023; 10:30 AM – 11:00 AM

Tea Break

7th December, 2023; 11:00 AM – 12:00 Noon

Prof. B. M. Belgaumkar Memorial Lecture-1 by Dr. P. M. Pathak (Professor, IIT Roorkee, India)

7th December, 2023; 12:00 Noon – 01:40 PM, Paper Presentation (Parallel Sessions)

Session: Machines and Mechanisms-I		Session Date & Time: 07/12/2023; 12.00 Noon – 01:40 PM	
		Venue 01: Dr. M. Visvesvaraya Hall (E-Hall)	
12:00 Noon – 12:20 PM	Design of synchronous reluctance motor for e-rickshaw application Paper ID-02, Harjyot Kalyan, Rohtash Dhiman		
12:20 PM – 12:40 PM	Artificial neural network-based model for galloping based piezoelectric energy harvester Paper ID-16, Rakesha Chandra Dash		
12:40 PM – 01:00 PM	Determination of knee and ankle trajectories and synthesis of four-bar linkage for rehabilitation Paper ID-24, Gurpreet Singh, Himanshu Chaudhary and Ramanpreet Singh		
01.00 PM – 01.20 PM	A review on extensions of Bennett linkages and the simulation of the linkages in MSC ADAMS Paper ID-20, Vishal Rajendra Naik, Sangamesh Deepak R		
01.20 PM – 01.40 PM	Kinematic and dynamic manipulability of the rotary double pendulum Paper ID-77, Ankur Deka, B. Sandeep Reddy		

Session: Robotics-I		Session Date & Time: 07/12/2023; 12.00 Noon – 01:40 PM	
		Venue 02: Dr. Vikram Sarabhai Hall(D-2)	
12:00 Noon – 12:20 PM	Effective human-robot interaction through motion retargeting approach Paper ID-10, Ashish Tripathi, Saurav Bhagsara, Shiv Manjaree Gopaliya, Suchetana Sadhukhan		
12:20 PM – 12:40 PM	Design and analysis of twin-motor anthropomorphic legged robot mechanism under various locomotion Paper ID-19, Arun Ashwain Sivarajan, Rajkumar Gothandaraman, Rengaraj Sivarajan,		
12:40 PM – 01:00 PM	Design of bevel rolling contact joint for transmission mechanism in robotics Paper ID-110, Mehran Sultan Wani and P.V. Manivannan		
01.00 PM – 01.20 PM	Investigating backpropagation neural networks for joint torque prediction during walking: a gait analysis study		

	Paper ID-34, Madhav Pandey, Jyotindra Narayan, Dinesh K Trivedi, Santosha K Dwivedy
01.20 PM – 01.40 PM	Upper-limb exoskeleton robot design driven by a pneumatic artificial muscle actuator Paper ID-36, Abhinav Punjabi, Garima Bisen, Pratiksha Kumari, Riya Jain, Usha Meel, Deepak Kumar

Session: Materials and Machine Design-I		Session Date & Time: 07/12/2023; 12.00 Noon – 01:40 PM Venue 03: Dr. Homi Jehangir Bhabha (PPT Hall/CDC)	
12:00 Noon – 12:20 PM	Stress analysis of rotating functionally graded cylindrical pressure vessels of variable thickness Paper ID-03, Sanjay Kumar Singh, Lakshaman Sondhi, A K Thawait, Rakesh Kumar Sahu, Shubhankar Bhowmick, Royal Madan	12:20 PM – 12:40 PM	Solidly mounted BAW Resonator using KNbO3 thin film for 5G application Paper ID-04, Poorvi Joshi, Ruhina Quazi
12:40 PM – 01:00 PM	Investigating stress and deformation behavior of functionally graded cylindrical shells under external pressure Paper ID-05, Lakshaman Sondhi, A K Thawait, Sanjay Yadav, Shubhankar Bhowmick, Royal Madan	01.00 PM – 01.20 PM	Influence of texture geometry in the steady state performance of dimple textured journal bearings under the effect of lubricant inertia Paper ID-07, Debajit Das, Sashindra Kumar Kakoty

7th December, 2023; 01:40 PM – 02:40 PM

Lunch

7th December, 2023; 02:40 PM – 04:15 PM

Plenary Talk-1 and Industry Presentation-1 (BSP)

7th December, 2023; 04:15 PM – 04:30 PM

Tea Break

7th December, 2023; 04:30 PM – 06:10 PM, Paper Presentation (Parallel Sessions)

Session: Machines and Mechanisms-II		Session Date & Time: 07/12/2023; 04:30PM – 05:50 PM Venue 01: Dr. M. Visvesvaraya Hall (E-Hall)	
04:30 PM – 04:50 PM	Strategic control of a hydraulic drive system with accumulator to enhance energy efficiency Paper ID-23, Sawan Kumar, Sanjoy K Ghoshal, J Das	04:50 PM – 05:10 PM	Design of active suspension system for an electric car using PID and LQR Controllers Paper ID-18, Mayank Khaparde, Shankar Kishnapillai, Piyush Shakya
05:10 PM – 05:30 PM	Optimal kinematic design of a robotic lizard using four-bar and five-bar mechanisms Paper ID-26, Rajashekhar V S, Debasish Ghose and Arockia Selvakumar Arockia Doss	05:30 PM – 05:50 PM	Morphing induced dynamics of two stage coupled telescopic beam Paper ID- 73, Debashis Singha, Senthil Murugan

Session: Robotics-II		Session Date & Time: 07/12/2023; 04:30 PM – 06:10 PM Venue 02: Dr. Vikram Sarabhai Hall(D-2)	
04:30 PM – 04:50 PM	Task capability improvement of collaborative manipulators Paper ID-43, Keshab Patra, Arpita Sinha, Anirban Guha	04:50 PM – 05:10 PM	Modelling and simulation of 3-D printed concrete layers and validation using gantry robotic printer



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	Paper ID-40, Rajan Sahai, Ravindra Singh Bisht, Shivam Kumar, Siddharth Singh, Soraj Kumar Panigrahi
05:10 PM – 05:30 PM	Pose detection based real time control of robotic manipulator for remote locations Paper ID-58, Mayank Patel, Shailesh Bamoriya, Eashita Chowdhary, C S Kumar
05:30 PM – 05:50 PM	Workspace analysis of cable-driven parallel robots for improved productivity in 3D printing Paper ID-59, Keval S. Ramani
05:50 PM – 06:10 PM	Study of drag forces in fluid-filled pipe inspection robot Paper ID-111, S. Haribabu, P.M. Pathak

Session: Vibration and Control-I		Session Date & Time: 07/12/2023; 04:30 PM – 06:10 PM Venue 03: Dr. Homi Jehangir Bhabha (PPT Hall/CDC)	
04:30 PM – 04:50 PM	Simulink-based comparative study and selection of a controller for a waist assistive exoskeleton Paper ID-17, Mervin Joe Thomas, Jayant Kumar, Shubhashisa Sahoo, Santhakumar Mohan		
04:50 PM – 05:10 PM	Elastic wave attenuation of metamaterial box beam with hybrid resonators Paper ID-29, Sunny, Senthil Murugan		
05:10 PM – 05:30 PM	Gearbox fault diagnosis through time synchronous averaging of vibration signature Paper ID-38, Soumya Jain, Varun Dutt Saxena, Sanskar Agarwal, Hemant Patel, Manoj Chouksey		
05:30 PM – 05:50 PM	Assessment of tooth wear in a profile modified spur geared system using vibration signal analysis Paper ID-39, Akash Mishra, Jawaz Alam, Sumanta Panda		
05:50 PM – 06:10 PM	Chatter detection in a tapered workpiece during turning process using acoustic signals Paper ID-60, Sanjay Sharma, Vijay Kumar Gupta		

8th December, 2023; 09:00 AM – 09:30 AM

Spot Registration for Participants

8th December, 2023; 09:30 AM – 10:45 AM

Plenary Talk-2 (Dr. Sujatha Srinivasan, Professor, IIT Madras)

8th December, 2023; 10:45 AM – 11:00 AM

Tea Break

8th December, 2023; 11:00 AM – 01:00 PM, Paper Presentation (Parallel Sessions)

Session: Machines and Mechanisms-III		Session Date & Time: 08/12/2023; 11.00 AM – 01:00 PM Venue 01: Dr. M. Visvesvaraya Hall (E-Hall)
11:00 AM – 11:20 AM	Effect of Manufacturing and Assembly Tolerances on the Transmission Design of an MIS Robot Paper ID-42, Amanpreet Singh, Jitendra P. Khatait	
11:20 AM – 11:40 AM	Estimation of insertion force for assembly of rigid body through multiple guides Paper ID-45, Sudheer Patri, B. K. Sreedhar	
11:40 AM – 12:00 Noon	Design and development of an anti-lowering device for the absorber rod drive mechanism of a fast breeder reactor Paper ID-46, Sudheer Patri, Nishal Kaushal, B. K. Sreedhar	
12.00 Noon – 12.20 PM	Development of graphical user interface (GUI) for Recursive Dynamics Simulator (ReDySim) for legged systems Paper ID-51, Aman Gupta, Alinjar Dan, Saurabh Chaudhary, S K Saha, Suril V. Shah	
12.20 PM – 12.40 PM	Detection of isomorphism and inversions of kinematic chains using an evolutionary approach Paper ID-52, Kunal Dewangan, Purushottam Prajapati	
12.40 PM – 01.00 PM	Productivity improvement on fabrication line of baler at CHNi, pune Paper ID-67, Gaurav Bhagwat Bhendarkar, Sushant S Satputaley, Chaitanya Madankar, Devashish Dhvale, Gaurav Hajare	

Session: Robotics-III		Session Date & Time: 08/12/2023; 11.00 AM – 01:00 PM Venue 02: Dr. Vikram Sarabhai Hall(D-2)
11:00 AM – 11:20 AM	Path planning for a collaborative robot with a long tool through a constricted passage Paper ID-70, Shilpa Pusuluri, Pranav Pothapragada, P Vivekananda Shanmuganathan	
11:20 AM – 11:40 AM	Development of a multi-sensor automatically guided vehicle with obstacle detection and object-following capabilities Paper ID-66, Sai Yashwanth Palli, Harsha Vardan Sirivella, Poolan Vivekananda Shanmuganathan	
11:40 AM – 12:00 Noon	Impact of misalignment on wearable arm robotic system Paper ID-74, Bhavna, Ekta Singla and Dhiraj k Mahajan	
12.00 Noon – 12.20 PM	Development of an intelligent image recognition system for a single actuating wave robot Paper ID-75, Sivaramakrishnan Natesan, Lokesh Kumar N, Surya S, Bevan V and Vijayaragavan ARR	
12.20 PM – 12.40 PM	Design and development of an industrial grade mobile robot platform Paper ID-89, Rahul, S K Saha, S M Ishtiaque	
12.40 PM – 01.00 PM	Visual wrench guided robot-assisted spine surgery Paper ID-98, Bimmi Bharadvaj, Amit Kumar, Gaurav Bhutani, T A Dwarakanath	

Session: Materials and Machine Design-II		Session Date & Time: 08/12/2023; 11.00 AM – 01:00 PM Venue 03: Dr. Homi Jehangir Bhabha (PPT Hall/CDC)
11:00 AM – 11:20 AM	Design and fabrication of a three-finger soft gripper Paper ID-31, Namrata Dwivedi, Satviki Shukla, Prateek Gupta, Nikhil Sher, Deepak Kumar	



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11:20 AM – 11:40 AM	Crack sealing control of concrete pipe by robust sliding mode control with different reaching law Paper ID-33, Santosh Kumar
11:40 AM – 12:00 Noon	An adaptive control law for emergency braking of a dual cart-trolley overhead crane Paper ID-79, Shivani Raj, B Sandeep Reddy
12.00 Noon – 12.20 PM	Fault diagnosis of ball bearing using low-cost edge device and deep learning Paper ID-37, Tauheed Mian, Anurag Choudhary, S Fatima
12.20 PM – 12.40 PM	Design and development of a nitinol actuated, crab like milliscale octobot Paper ID-103, D. Rashmi, Anoop Singh Yadav, Sunilkumar Ainwad
12.40 PM – 01.00 PM	Biomechanical comparisons of v thread and trapezoidal thread screw-rod fixation in pedicle section of cervical spine: an in-silico study Paper ID-57, Ram Kumar, Amit Kumar, Shabnam Kumari

8th December, 2023; 01:00 PM – 02:00 PM

Lunch

8th December, 2023; 02:00 PM – 03:30 PM

Plenary Talk-3 (Dr. C. S. Kumar, IIT Kharagpur) and Expert talk from Industry-2 (Dr. Priti Yadav)

8th December, 2023; 03:30 PM – 03:45 PM

Tea Break

8th December, 2023; 03:45 PM – 05:30 PM, Paper Presentation (Parallel Sessions)

Session: Machines and Mechanisms-IV		Session Date & Time: 08/12/2023; 03.45 PM – 05:05 PM Venue 01: Dr. M. Visvesvaraya Hall (E-Hall)	
03:45 PM – 04:05 PM	Experimental validation of the position and orientation workspaces of the stewart-gough platform Paper ID-72, Ashwath Ram S, Anirban Nag, Sandeep Kumar, Subir Kumar Saha		
04:05 PM – 04:25 PM	Design and development of automated office work desk with control for vertical height and horizontal alignment Paper ID-21, Shashank S, Sandesh Nayak, Shashanth Kumar, Subramanya Nayak, Shravan Hegde and Yashas D		
04:25 PM – 04:45 PM	Bond graph modelling of backlash and removal of its effect using dual drive Paper ID-95, Pooja Shakya, Vivek Soni, Anand Vaz		
04:45 PM – 05:05 PM	Analytical determination of link interference in planar parallel manipulators using elliptical enclosures Paper ID-86, Aditya Mahesh Kolte, Bibekananda Patra, Sandipan Bandyopadhyay		

Session: Robotics-IV		Session Date & Time: 08/12/2023; 03.45 PM – 04:45 PM Venue 03: Dr. Homi Jehangir Bhabha (PPT Hall/CDC)	
03:45 PM – 04:05 PM	Design analysis, motion planning and development of an inchworm-inspired biped wall-climbing robot Paper ID-93, Ravindra Singh Bisht, Sarwaani Kaushik, Manushka Uniyal, Chandrabhan Patel, Kanti Lal Solanki		
04:05 PM – 04:25 PM	Design optimization of series elastic actuator (SEA) for lower limb rehabilitation exoskeleton Paper ID-101, Mittapally Sandeep Reddy, Sujatha Srinivasan, Sourav Rakshit		

04:25 PM – 04:45 PM	Workspace and trajectory analysis of the 3-RPR planar parallel manipulators with joint clearance Paper ID-104, Ankur Jaiswal, Sidhant Barai, Abhishek Jha, Darren Alton Dsouza, Ankit Aggarwal
Session: Vibration and Control-II	
Session Date & Time: 08/12/2023; 04.45 PM – 05:30 PM Venue 03: Dr. Homi Jehangir Bhabha (PPT Hall/CDC)	
04:45 PM – 05:05 PM	Thermoelastic damping in a perforated MEMS resonator Paper ID-76, Dwivedi, Jujjuvarapu, Pandey
05:05 PM – 05:30 PM	Smart hybrid piezoelectric vibration control scheme in composite sandwich panels with MRE core Paper ID-99, Jonna Naresh, J Srinivas

Session: Materials and Machine Design-III	
Session Chair: Dr. G. Srinivasu	
Session Date & Time: 08/12/2023; 03.45 PM – 05:30 PM Venue 02: Dr. Vikram Sarabhai Hall(D-2)	
03:45 PM – 04:05 PM	Using SEA for reducing torque of an active compliance Paper ID-35, Harsh Yadav, Vijay Kumar Gupta, Tanuja Sheorey
04:05 PM – 04:25 PM	Optimum hold-down configuration design for satellite dual gim-bal antenna mechanism using FEA Paper ID-83, V Sri Pavan Ravichand, K Balaji, B P Nagaraj
04:25 PM – 04:45 PM	Finite Element analysis of a novel lower extremity exoskeleton with a polycentric knee joint Paper ID-85, Rwittik Barkataki, Zahnupriya Kalita, Sushen Kirtania
04:45 PM – 05:05 PM	Design of shape-changing drone mechanism under various drag and obstacles Paper ID-88, Sai Rithwique Raghupatruni, Rajkumar Gothandaraman, Ramaprabha Rengaraj
05:05 PM – 05:30 PM	Design and development of staircase foldable mechanism Paper ID-90, Ch. Naveen Reddy, Kode Jaya Prakash and Meda Ganesh Vaibhav

8th December, 2023; 06:00 PM – 07:00 PM

General Body Meeting

8th December, 2023; 07:30 PM – 08:30 PM

Cultural Event

8th December, 2023; 08:30 PM Onwards

Conference Dinner



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9th December, 2023; 09:00 AM – 09:30 AM

Spot Registration for Participants

9th December, 2023; 09:30 AM – 11:00 AM

Plenary Talk-4 and Industry Presentation-3 (BEML)

9th December, 2023; 11:00 AM – 11:15 AM

Tea Break

9th December, 2023; 11:15 AM – 12:00 Noon

SMDC Evaluation

9th December, 2023; 12:00 AM – 01:00 PM

Prof. K. Lakshminarayana Memorial Lecture -2 by Dr. Sunil K. Agrawal (Professor, Columbia University, New York, USA)

9th December, 2023; 01:00 PM – 02:00 PM

Lunch

9th December, 2023; 02:00 PM – 03:40 PM, Paper Presentation (Parallel Sessions)

Session: Machines and Mechanisms-V		Session Date & Time: 09/12/2023; 02.00 PM – 03:40 PM Venue 01: Dr. M. Visvesvaraya Hall (E-Hall)
02.00 PM – 02.20 PM	Symbolic approach in modelling of flexible multi-body systems using absolute nodal coordinate formulation (ANCF) cable element Paper ID-92, Surya Pratap Rathour and Rama Krishna K	
02.20 PM – 02.40 PM	Design of an engaging-disengaging compliant mechanism by using bistable arches Paper ID-78, Mehul Srivastava, Trishna Gunna, Makarand Kandiyaped Serkad, Manu Sebastian, Safvan Palathingal	
02.40 PM – 03.00 PM	Self-offloading footwear using a pin-connected-arch assembly and its comparison with a constant-force compliant mechanism Paper ID-107, Nikhil Muralidhar, G K Ananthasuresh	
03.00 PM – 03.20 PM	Design, analytical studies and realisation of a split nut hold-down mechanism for space applications Paper ID-117, Anoop Kumar Srivastava, Sai Sreenivas, Sidharth Tiwary, K Prakasha, K Balaji, Abhishek Kumar	
03.20 PM – 03.40 PM	Bolt failure investigation and remedial actions for non-explosive holddown mechanism used in dual axis drive mechanism for space application Paper ID-119, Anoop Kumar Srivastava, K Prakasha, Abhishek Kumar, H N Suresh Kumar	

Session: Robotics-V		Session Date & Time: 09/12/2023; 02.00 PM – 03:20 PM Venue 02: Dr. Vikram Sarabhai Hall(D-2)
02.00 PM – 02.20 PM	Vision guided robot for agriculture assistance Paper ID-25, Rohit R Patil, Sandesh Nayak, Hemanth kumar Kabojinavar, Shivaprasad S Sankangoudar, Vishal B Channammanavar	
02.20 PM – 02.40 PM	Digital twin-based path planning and obstacle avoidance for a quadruped robot Paper ID-71, Ayan Naskar, Pranav Pothapragada, P. Vivekananda Shanmuganathan	
02.40 PM – 03.00 PM	Modelling of cable-driven continuum robots with multiple generally routed cables Paper ID-113, Soumya Kanti Mahapatra, Ashitava Ghosal	
03.00 PM – 03.20 PM	Dynamically isotropic gough-stewart platform design with flexural joints Paper ID-114, Yogesh Pratap Singh, Nazeer Ahmad and Ashitava Ghosal	
03.20 PM – 03.40 PM	Effective Visualization and Validation of Motion of a Mechanical System using Application Programming Interface of a CAD Software Paper ID-120, Rajeevlochana G. Chittawadigi	

Session: Materials and Machine Design-IV		Session Date & Time: 09/12/2023; 02.00 PM – 03:40 PM Venue 03: Dr. Homi Jehangir Bhabha (PPT Hall/CDC)
02.00 PM – 02.20 PM	Finite element analysis of thick beam attached with piezoelectric strips for offshore pipeline application Paper ID-47, R Megha, Vadivuchezhian Kaliveeran	
02.20 PM – 02.40 PM	Prototyping of QR code entrance guard system for pandemic preparedness, with respect to covid 19 experience Paper ID-109, Varsha K. Patil, Aditya K Patil, Abhlesh Negi	
02.40 PM – 03.00 PM	Development, challenges and on-orbit deployment of a large flexible antenna on communication satellite Paper ID-118, Anoop Kumar Srivastava, Gaurav Sharma, B Lakshminarayan, Abhishek Kumar	
03.00 PM – 03.20 PM	Deep learning-based comparison of performance of different object detection models for images obtained at various elevations using UAV Paper ID-105, A D Prasad, Tushar Sahu, Bandaru Saket	
03.20 PM – 03.40 PM	Advancing Wound Healing with Negative Pressure Wound Therapy: Clinical Effectiveness, Value Assessment and Cost Reduction Approaches Paper ID-116, Abhipri Dubey, Nainee Pandya and Suwarna Torgal	

9th December, 2023; 04:00 PM – 05:30 PM

Valedictory Session

9th December, 2023; 05:30 PM – 06:00 PM

High Tea