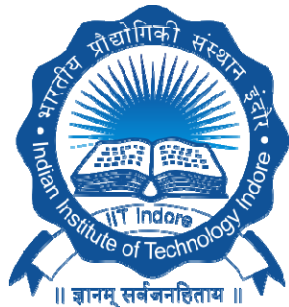
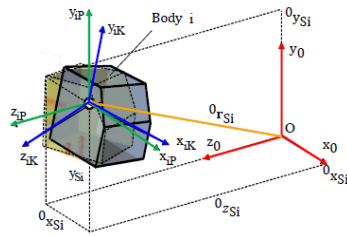
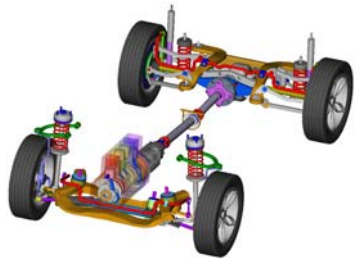


Five Days Course on Multibody Dynamics

For Practicing Engineers and Research Beginners

2nd to 6th October 2017



Discipline of Mechanical Engineering
Indian Institute of Technology Indore
Indore, Madhya Pradesh, India
<http://iiti.ac.in/GIAN/>
<http://people.iiti.ac.in/~santhakumar/>

Course Contents

Introduction to Multibody Dynamics
Kinematics of Multibody Systems
Newton-Euler Equations
Lagrange Equations of 1st and 2nd Kind
Equations of Motion
State Equations of General Systems
State Equations of Linear Oscillatory Systems
Fundamental Matrix
Case Studies
Recent Research Activities of Multibody Systems
Modelling and Control of Multibody Systems

Hands on experience

Numerical Simulations of Multibody Systems
Introduction to Multibody Dynamics Packages
Kinematic and Dynamic Modelling of Robots
Control of Mechanical and Robotic Systems

Packages: MATLAB, SIMULINK, MSC-ADAMS

Examination and Certificate

An examination will be conducted at the end of the course and grade sheets as well as participation certificate will be give to all the participants.

Course Objectives

The ability of describing any mechanism mathematically with its inherent physical effects like elasticity, damping and friction as well as the analysis of the motion behavior of those systems shall be imparted within this lecture.

This lecture covers the linear vibrations of multibody systems, consisting of rigid masses, springs, dampers and excitors. For the computer aided analysis of systems with multiple degrees of freedom matrix operations are used. The methodical approach imparted in this lecture has the benefit of being applicable to nearly any technical system and can be conducted with few commands by suitable computer programs. Typical Applications in the area of robotics and vehicle dynamics will highlight very recent research activities of the Department of Mechanism Theory and Dynamics of Machines of RWTH Aachen University.

The lecture course addresses students of undergraduate and graduate level (BTech, MTech, PhD students) as well as faculty teaching mechanical system topics which want to get more familiar with the modelling and simulation of multi-body systems.

The objectives of the course are

- The students have a profound knowledge of theory of vibrations.
- The students are capable of comprehending, describing and analyzing vibratory systems.
- The students have the ability of describing mathematically any mechanical system with its inherent physical effects like elasticity, damping and friction.
- The students are familiar with the most important matrix based procedures for the calculation of Eigen motions and the behavior of linear systems under forced excitations.
- For the calculation of nonlinear system the students can select suitable program systems and carry out proper simulations.
- The students are able to properly interpret simulation results especially under consideration of simplifications within the model compared to the real system.
- The students are able to derive from their knowledge the necessary methods and proceedings for the analysis and synthesis of the systems in regard. Thus they are capable to solve - accessing their acquired theoretical knowledge - complex problems concerning the choice and design of industrial vibratory systems.

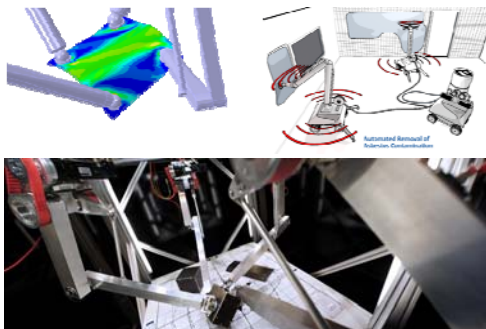
Teaching Faculty



Professor Burkhard Corves: After completing his mechanical engineering studies at RWTH Aachen University in 1984, Burkhard Corves worked as a research assistant at the Department of Mechanism Theory and Machine Dynamics (IGM) where he graduated as PhD in robotics in 1989 and took the post of a Chief Engineer of IGM. After working in special machine construction in Germany and Switzerland from 1991 to 2000, he was appointed a university professor and director of the Department of Mechanism Science and Machine Dynamics (IGM) at RWTH Aachen University in 2000. Among other duties he is the chairman of the Association of German Engineers (VDI) Advisory Board "Mechanism and Machine Science" and member of the Executive Council of the International Federation for the Promotion of Mechanism and Machine Science (IFTOMM). To date, he is author and co-author of almost 300 publications in the fields of handling technology and robotics, glass machine technology, mechanism science and machine dynamics.

His current research projects related to this course are:

- Active Shaping and assembly of flexible objects
- The Bots2Rec Project
- PARAGRIP: Flexible handling of elements based on reconfigurable parallel kinematic structures.



Course Coordinator



Santhakumar Mohan graduated in Mechanical Engineering from Government College of Engineering, Salem, Tamil Nadu (India) in 2003. He received his Master degree (ME) in the discipline of Manufacturing Engineering from Government College of Technology, Coimbatore, Tamil Nadu (India) in 2005. He got his PhD (Robotics and Control) from Indian Institute of Technology Madras, Chennai (India) in 2010. From June 2010 to March 2011, he worked as an assistant professor in the Department of Mechanical Engineering at National Institute of Technology Calicut (NITC), Kerala (India). He then worked as world-class university (WCU) postdoctoral fellow at Korean Advanced Institute of Science and Technology (KAIST), Daejeon (Republic of Korea), in addition to this, he received another prestigious Brain Korea 21 (BK21) Post-doctoral fellowship with the same institute from September 2011 to March 2012. In 2012, he joined the faculty of the Mechanical Engineering at Indian Institute of Technology Indore. Currently, he is the head, Centre for Robotics and Control, IIT Indore. He is holding visiting faculty positions at IISc Bangalore, India, RWTH Aachen, Germany and ECN, France. His active research areas include underwater vehicle control, underwater manipulator design and control, parallel robotic platforms, and dynamic modelling and control of dynamic systems. Recently, he has received the outstanding young Scientist for the year 2014 from Korea Robotics Society and Alexander von Humboldt Fellowship (2016–2017). He has published more than 100 articles in various journals and conference proceedings. He has 2 Indian patents in parallel robots and lower limb rehabilitation mechanisms.

Who can attend?

- Undergraduates, MTech/M.Sc, and PhD science stream students. Any student with a basic background in dynamics and matrix algebra will be able to follow these lectures and gain valuable information.
- BTech/B.Sc and MTech/M.Sc level teachers who wish to update their knowledge in an important special field of multi-body dynamics and machine vibrations.
- Executives, engineers and researchers from industry, service and government organizations including R&D laboratories who are engaged in multi-body dynamics and vibration related problems.

Registration Fee

Students (UG & PG)	: Rs. 3,000
Research Scholars	: Rs. 4,000
Faculty members	: Rs. 5,000
Industry and others	: Rs. 10,000
Foreigners (any positions)	: USD 250

Important Dates

Last date for Registration	: September 15, 2017
Course schedule	: October 2 - 6, 2017

Travel Information

Indore located in Central part of India in Madhya Pradesh State. It will well-connected by rail, road and air. The nearest railway station is Indore Junction and the nearest Airport is Devi Ahilyabai Holkar Airport. For queries regarding travel information, please contact the course coordinator.

Accommodation

Paid accommodation will be provided to participants on first-come-first-serve basis.

Course fee includes course material, tutorial sheets, lecture handouts, lunch and tea during course days

Contact Details

For any information regarding eligibility, fee payment, travel information, accommodation, etc., please contact the course coordinator via email or phone.

Dr. Santhakumar Mohan

Associate Professor

Discipline of Mechanical Engineering

Indian Institute of Technology Indore

#1A-210/1B-301, POD Building, Simrol Campus

Indore, Madhya Pradesh, INDIA - 453552

Email: santhakumar@iiti.ac.in

Phone: +91-7324306517

Link for registration: <http://gian.iiti.ac.in/register.php>