

Program

		8:45 – 10:15 (1h30)	Kinematics Plenary Lecture Speaker : S. Caro	Coffee break 10:15 – 10:45	10:45-12:15 (1h30)	Dynamics Plenary Lecture Speaker : S. Briot	Coffee break 12:15 – 14:15	14:15 – 16:00 (1h45)	Project Simulation lab	Coffee break 16:00 – 16:30	16:30 – 18:15 (1h45)	Project Simulation lab
Monday		Kinematics & statics Plenary lecture Speaker : M. Carricato	Coffee break	Distance-based Kinematics Plenary Lecture Speaker : N. Rojas	Lunch	Project Simulation lab	Coffee break	Project Simulation lab				
Tuesday		Vibrations Plenary Lecture Speaker : E. Courtelle	Coffee break	Dynamic Visual Servoing Plenary Lecture Speaker : N. Andreff	Lunch	Industrial issues Plenary Lecture & Visit Speaker : SYMETRIE		Social Event				
Wednesday		Control Plenary Lecture Speaker : A. Chemori	Coffee break	Cable-Driven // Robots Plenary Lecture Speaker : T. Bruckmann	Lunch	Industrial issues Plenary Lecture Speaker : TECNALIA		Project Simulation lab				
Thursday		Cable-Driven // Robots Plenary Lecture Speaker : M. Gouttefarde	Coffee break	Design Plenary Lecture Speaker : O. Company	Lunch & Farewell reception							
Friday												

Admission

The number of participants is restricted to 45. Priority will be given to Ph.D. students and Post-docs from the European Community but a significant number of researchers and professionals, as well as students from other countries may also be accepted.

The registration includes two steps, a preregistration before the 1st of July 2018, where a scientific committee will select the candidates based on their CVs and send a confirmation as soon as possible. Accepted participants should proceed to final registration by August 30th, 2018 (www.lirmm.fr/pkm-2018/registred.html).

The lodging expenses and the meals will be supported by the organizers thanks to sponsor funding and completed by the registration fees of the participants. Participants must cover their own travel expenses.



Contact

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LIRMM



2nd Summer School On Parallel Robotics PKM 2018

September 17-21, 2018
Montpellier (France)

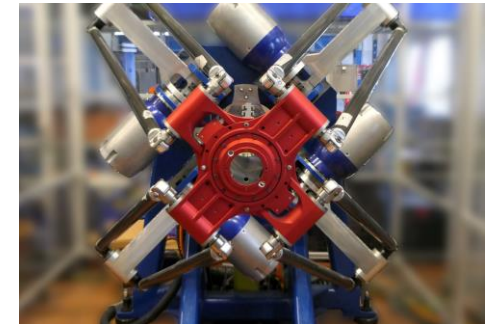


Image: SPIDER4 PKM ©: LIRMM

Coordinated by
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www.lirmm.fr/pkm-2018

Parallel Kinematic Systems

Control and mechanical Robotics community have devoted a huge research effort on parallel kinematics systems in the past four decades. The interest was motivated by a clear breakthrough compared to conventional serial robot architectures such as anthropomorphic, SCARA or gantry robots. Parallel kinematics systems have demonstrated higher performances in:

- dynamic capabilities in terms of high accelerations (up to 1000 m/s² accelerations have been reached by prototypes, pushing the limits of the mechanics, control and actuators),
- high payloads where hexapod systems can lift today several tons and position them accurately with six degrees of freedom,
- increased stiffness.

Scientific community has addressed many research topics. This work was mainly specific and as an example, we can cite in an unsorted manner: kinematics, dynamics, singularities, type-synthesis, dimensional synthesis, control, simulation, calibration, identification, design, technology, performance indices, reconfigurable devices and experiments.

A good control of these points is requested to obtain a convincing running prototype with potential applications in industry as a special machine or as a commercially available product.

As a short list of products that have reached the industrial market, we can mention:

- Hexapods or hexapod-like robots (also known as Gough, Stewart or Gough-Stewart platforms). Among them we can mention some products from PI, Symétrie company or Fanuc,
- Delta or Delta-inspired robots, licensed to ABB (Flexpicker) and now whose patent has entered the public domain. Therefore, this kind of robots is available from several robot manufacturers (Fanuc, Codian Robotics, SIG Pack Systems, Panasonic...),
- Tricept (Neos Robotics) and Exechon (Exechon AB),
- Quattro, Hornet (Adept).

Indeed, it is worth to notice that despite the huge research effort devoted to this domain, only few products are available on the market. The main explanations lie on one hand in the fact that such robots can seem complex and require a big research investigation and on the other hand that academic research is split into specialized domains. Moreover, when prototypes or demonstrators are built, the goal is to validate theories through experiments and not to convince industrial partners for future products or applications.

Nevertheless, some demonstrators are built in that way and allow meeting industrial applications. On a research point of view, theory has to face today's state of the art technological limitations in several points like:

- Industrial control systems,
- Active and passive joints integration,
- Collision avoidance.

The goal of this summer school PKM 2018 is to share the knowledge on parallel kinematics machines design, modelling and control during a whole week, targeting realistic prototypes to face real problems met in the industry.

The courses are divided in plenary lectures and simulation labs. They are addressed to PhD students, post-docs and researchers already involved in the area or interested in parallel kinematic machines. Basic background in mechanical, computer science, control and electrical engineering is recommended.

Content

Different session formats will be planned:

- Plenary lectures by invited international speakers,
- Plenary lectures by local speakers and industrials,
- Project sessions with simulation labs,
- Visit of one of the leading providers of hexapod solutions for positioning and motion applications.

The topics tackled during the sessions are:

- Kinematics,
- Dynamics,
- Design,
- Vibrations,
- Control,
- Simulation (with Matlab/Adams coupling),
- Special sessions on cable driven parallel robots.

Invited lecturers

Chosen among the most well-known experts worldwide, the lecturers have a significant theoretical and practical background in parallel kinematic mechanisms communities:

Tobias Bruckmann, University Duisburg-Essen, Germany

Marco Carricato, University of Bologna, Italy

Nicolas Andreff, Femto, Besançon, France

Nicolas Rojas, Imperial College, UK

Eric Courteille, LGCGM, INSA - Rennes, France

Stéphane Caro, Sébastien Briot, LS2N, CNRS, France

Ahmed Chemori, Olivier Company, Marc Gouttefarde,

LIRMM, UM/CNRS, France

Lectures and school materials

All lectures will be given in English. The lecturers' slides will be available online at the time of the class. *The students are advised to bring their own laptop with a running Matlab version and a "student version" of ADAMS software.*

ECTS

The 36-hour courses of the Summer School will be accredited by the Doctoral School on Information, Systems and Structure (I2S) of the University of Montpellier (a Doctoral School in the French Universities manages the Ph.D. degree). 5 ECTS credit points will be awarded to student attendees.

Accommodation

All the lectures will be given at Belambra Club - La Grande Motte Port, which is located at La Grande-Motte (seaside resort near Montpellier)

www.lirmm.fr/pkm-2018/get.html.

The attendees will have individual rooms in 2-room apartments sharing sanitary facilities.