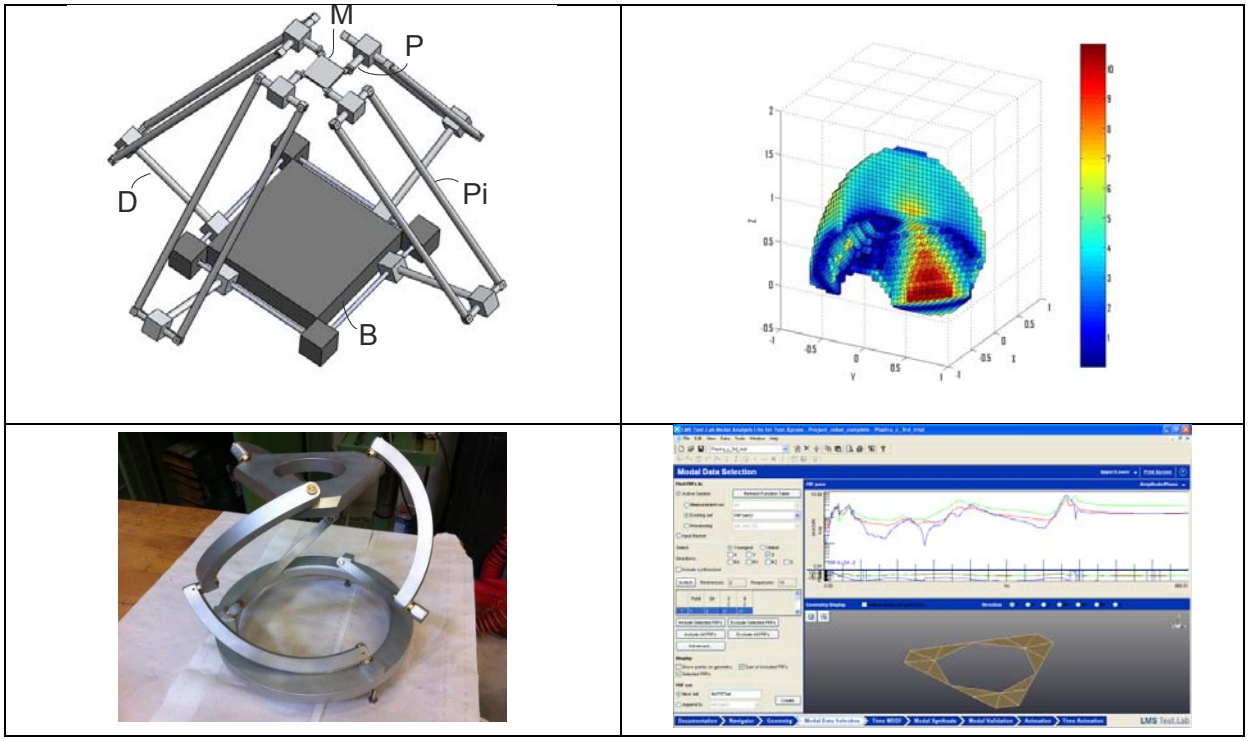
Dipartimento Ingegneria Industriale – Università di Catania

ELASTODYNAMICS of a PARALLEL KINEMATICS ROBOT

The research unit of Catania is engaged in the development and implementation of multibody finite element formulations for the study of elastodynamics parallel kinematic robot. The algorithms are designed to optimize the existing structures of spatial mechanisms used in industrial robotics, or to create new and more efficient. The complexity of optimization kinematics / dynamics and structural space of a mechanical system requires, in fact, specific algorithms and mathematical methods in that it is performed on a working space of the operating mechanism and not on individual positions. These algorithms need to be versatile in order to consider different types of architectures: parallel, serial, hybrid; or joints: revolute, prismatic, cylindrical, spherical, universal etc. Moreover, they can be extended to systems "compliant", or monolithic systems devoid of ordinary joints, increasingly used for machining of high precision micrometric or in systems of measurement and experimentation.



Unit of UNICT

- prof. ing. Rosario Sinatra (scientific responsible)
- prof. ing. Alessandro Cammarata

Papers:

1. CAMMARATA A., SINATRA R. (2014). "Elastodynamic optimization of a 3T1R parallel manipulator." **Mechanism and Machine Theory** 73: 184-196.
2. CAMMARATA A, CONDORELLI D, SINATRA R (2013). An Algorithm to Study the Elastodynamics of Parallel Kinematic Machines with Lower Kinematic Pairs. **JOURNAL OF MECHANISMS AND ROBOTICS**, vol. 5, p. 1-9, ISSN: 1942-4302.
3. CAMMARATA A (2012). ON THE STIFFNESS ANALYSIS AND ELASTODYNAMICS OF PARALLEL KINEMATIC MACHINES. In: **Serial and Parallel Robot Manipulators: Kinematic Dynamics and Control** p. 85-108, Kocaeli:Serdar Kucuk, ISBN: 978-953-51-0437-7.
4. FENGFENG XI, CAMMARATA A, SINATRA R (2011). TRIPOD STIFFENING USING CLAMPING PLATES WITH NO INCREASE OF MOVING MASS. **MECCANICA**, vol. 41, ISSN: 0025-6455, doi: 10.1007/s11012-011-9437-x.