Short Course for PhD Students (Barcelona, September 5-12, 2019)

Recent Results on Planar and Spherical Kinematics

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This short course illustrates recent results, the speaker deduced, on planar and spherical kinematics, together with their use in planar dynamics.

1st Lecture (3 hours on September 5, 2019)

Planar Kinematics Revisited through Instant Centers (ICs)

- Role of the ICs in planar mechanism design (e.g., vehicle suspensions, lower-limb prostheses for amputees, etc.)
- Systematic determination of all the ICs: the case of the indeterminate linkages
- Singularity analysis with the ICs: single-DOF and multi-DOF mechanisms

2nd Lecture (3 hours on September ??, 2019)

Extension to Spherical Kinematics by Using Instantaneous Pole Axes (IPAs)

- From planar to spherical geometry: notations
- Systematic determination of all the IPAs
- Singularity analysis of spherical mechanisms with the IPAs

3rd Lecture (3 hours on September 12, 2019)

Dynamics of Planar Mechanisms

- Dynamic models of single-DOF planar mechanisms based on centrodes and velocity coefficients
- Mechanics of planar mechanisms in the configuration space

References

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