

Summer Screws 2010

Tentative Program

Monday, 26 July

09:15 Welcoming, introduction, and announcements.

09:45 *Vector spaces, examples. Twists, wrenches, and screws.*

12:30 Lunch

14:00 *Linear dependence and independence.*

17:30 Visit of IDCHE

19:00 Welcome reception

Tuesday, 27 July

08:45 *Spanning systems, bases, coordinates.*

10:45 *Dual spaces and scalar products. Systems of freedoms and constraints.*

12:30 Lunch

14:00 *Types and classes of screw systems.*

Wednesday, 28 July

08:45 *Constraint analysis. Type synthesis of single loop mechanisms.*

10:45 *Type synthesis of translational parallel mechanisms.*

12:30 Lunch

14:00 *Mobility analysis of parallel mechanisms.*

Thursday, 29 July

08:45 *Velocity analysis of mechanisms. Geometric and actuated constraints.*

10:45 *Input-output velocity equations of parallel mechanisms.*

12:30 Lunch

14:00 *Input-output velocity equations of closed-loop mechanisms.*

Friday, 30 July

08:45 *Singularity analysis of mechanisms.*

10:45 *Singularities of parallel mechanisms.*

12:30 Lunch

14:00. *The G_F set of basic motion units. Boolean calculation of the G_F set. Type Synthesis.*

Saturday, 31 July

Free day

Sunday, 1 August

08:45 *On the history of screw theory.*

10:45 *Elastic modeling with twists and wrenches.*

12:30 Lunch

14:00. *Elastic modeling of joints and links. Principal axes of inertia.*

Monday, 2 August

08:45 *Mappings between screw spaces, robot stiffness and inertia.*

10:45 *Eigenvalue problems. Structure of robot compliance.*

12:30 Lunch

14:00. *Differentiation, acceleration.*

Tuesday, 3 August

Visit to Expo 2010 Shanghai

Wednesday, 4 August

08:45 *Momentum and inertia. Equation of motion of an unconstrained rigid body.*

10:45 *Dynamics of a constrained rigid body.*

12:30 Lunch

14:00 *Inverse and forward dynamics algorithms.*

Thursday, 5 August

08:45 *Rigid-body displacements in 2D and 3D. Active and passive transformations.*

10:45 *Robot kinematics.*

12:30 Lunch

14:00 *Lie Groups: examples, subgroups, representations.*

Friday, 6 August

07:45 Breakfast

08:45 *Lie algebra: Lie brackets, inverse robot Jacobians.*

10:45 *Dual Lie algebra: coscrews, momenta and wrenches.*

12:30 Lunch

14:00 *Rigid body motions.*

Remarks

1. Afternoon sessions may vary in length, as needed.
2. The number and the timing of the breaks between the lectures (in the morning as well as the afternoon) may vary and will be decided by the lecturers.
3. Tea and coffee will be provided during the breaks.