

Prof. Marco Picasso

Mathematics Institute of Computational Science and Engineering - MATHICSE

SEMINAR OF NUMERICAL ANALYSIS

➤ **WEDNESDAY 28 NOVEMBER 2012 - ROOM GC A3 30 - 16h15**

Dr. Chantal Landry, (WIAS, Weierstrass-Institut, Berlin, Germany) will present a seminar entitled:

"An optimal control problem for the collision-free motion planning of industrial robots"

Abstract:

Industrial robots are typically used on production lines of car manufacturing where they replace workers in performing repetitive tasks. To ensure the competitiveness of the car production robots must work as quickly as possible and without colliding with each other and the surrounding obstacles. The fastest collision-free motion of a robot is modeled as the solution of an optimal control problem where the objective function is the time needed for the robot to move from one task to another. The robot and the obstacles are both represented as finite unions of convex polyhedra. This description combined with linear programming arguments allows to include the collision avoidance criteria as state constraints in the optimal control problem. The resulting problem is then solved using a sequential quadratic programming method. To decrease the number of unknowns and constraints an active set strategy based on back-face culling is added. Numerical examples illustrate the efficiency of this strategy.

Lausanne, 6 november 2012 / MP/cr

The seminars taking place at the Section of Mathematics are announced on internet address : [www
http://mathicse.epfl.ch/seminars](http://mathicse.epfl.ch/seminars)