



# Séminaire ISIR

Mardi 2 juin à 10H30

Joseph Mirabel

Campus Jussieu, 4 place Jussieu, Paris  
Salle de réunion H20

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## HPP: a software framework for manipulation planning.

**Abstract :** I will present an open-source software framework (called Humanoid Path Planner – HPP) for path and manipulation planning. Some features like built-in kinematic chains and implementation of non-linear constraints make the framework a good fit for humanoid robot applications. At installation, a CORBA server is installed. The server can be controlled by python scripting to easily define and solve a motion and manipulation problems. The main contribution of the presented work is a software architecture enabling developers to quickly define a manipulation problem. Using the theoretical results from previous works, a manipulation problem can be modelled with a graph of constraints that is introduced. With a non-linear constraints solver, an RRT-based algorithm makes use of the graph of constraints to generated a valid manipulation path.

The framework has been successfully tried on various cases: PR2 manipulation a box, HRP-2 walking quasi-statically, UR5 end-effector following a line. These examples will be accompanied with some details to show how easily such problems can be defined with our framework.

**Short bio :** Joseph Mirabel is a PhD student in the Gepetto team at LAAS, Toulouse, where he works primarily on documented object, with the goal to be able to plan trajectories including object manipulation for humanoid robots.