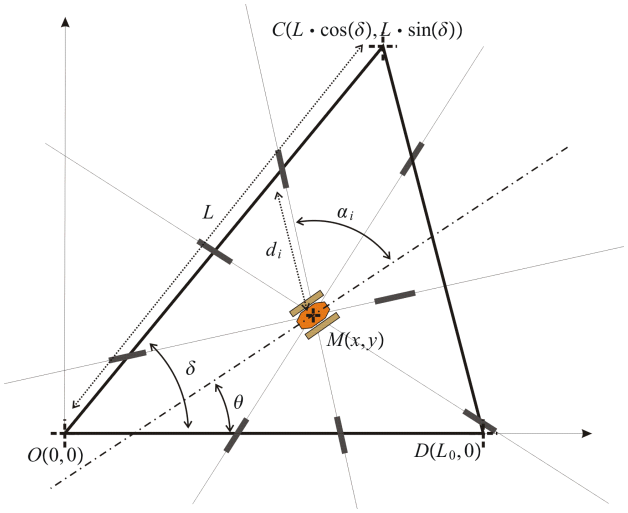
Abstract

For a robot, the ability to localize itself in a unknown environment is essential for it to be able to move freely and perform its mission. Simultaneous Localisation And Mapping (SLAM) algorithms are developped for that purpose. Those algorithms use robot sensors measurements (telemeter, compass,...) and return the map of the area and the actual position of the robot. The complexity of those algorithms lies in the fact that first, the equations related to this problem are non linear, so the methods that linearize the equations as the Kalman filter based methods will have some trouble with solving it. In the other hand, the forementionned measurements will contain outliers. In the case of telemetric sensors, an outlier may be caused to some unpredicted object between the robot and the target or due to the echo caused by the multiple path. Least square methods are not adapted to that kind of data.

In the talk, I will explain how a SLAM problem can be translated into a Constraint Satisfaction Problem (CSP) i.e. a set of equations. The obtained CSP is solvable using set membership theory based methods. The map of the environment can often be represented by a set of polygones and standalone segments so we chose an example where we try to make SLAM in a triangular room using telemetric measures as shown in figure



Keywords : SLAM, Interval Analysis, set membership theory, robust algorithm, guarateed result.