Albert-Ludwigs-Universität Freiburg, Institut für Informatik
PD Dr. Cyrill Stachniss
Lecture: Robot Mapping
Winter term 2012

Sheet 8

Topic: Least-Squares

Submission deadline: January, 14

Submit to: `robotmappingtutors@informatik.uni-freiburg.de`

Exercise: Odometry Calibration

Implement a odometry calibration tool based on least-squares method as presented in the lecture. To support this task, we provide a small *Octave* framework (see course website). The framework contains the following folders:

data contains the recorded raw odometry and the motion estimated by a scan-matcher for each time step.

octave contains the Octave framework with stubs to complete.

plots this folder is used to store images.

The below mentioned tasks should be implemented inside the framework in the directory `octave` by completing the stubs:

- Implement the functions in `ls_calibrate_odometry.m` for constructing and solving the least-squares system.
- Implement the function in `apply_odometry_correction.m` for applying the calibration matrix to a set of odometry measurements.
- Implement the function in `compute_trajectory.m` for chaining up the relative odometry measurements.

After implementing the missing parts, you can run the framework. To do that, change into the directory octave and launch *Octave*. To start the main loop, type `LSCalibrateOdometry`. The script will produce a plot showing the trajectory of the raw odometry measurements, the estimate obtained by scan-matching, and the odometry after applying the calibration. This plot will be saved in the `plots` directory.
The file XXXXX.png depicts the result that you should obtain.