

## 1 Karto filter code

Understanding the Karto filter code Refer for the theory to paper [1]

## 2 Tuning KartoSLAM

Parameters and definition for the KartoSLAM mapping approach. We are going to change and see the effect of the main parameters, as in GMapping (particles, linear and angular update, **no presence of resampling threshold**).

Strategy is starting with a low number of particles and increase them gradually, report results in a Table.

We select the best configuration as soon as the map presents an acceptable quality suitable for localization. **IMP**: Before mapping with the graph mapper, mount the laser upside down.

Table 1: Mapper.yaml parameters description, default constant values

Parameter	Value	Meaning
grid_resolution	0.05 [m]	grid map resolution, same as for GMapping
range_threshold	30	Keep it for now at this constant value, but a suitable definition should be found.
map_update_rate	5 [s]	same for GMapping
min_map_size	100 [m]	initial map size [m], same as GMapping

The range threshold has an influence in the mapping quality, the higher the better the map using the same particles. I am looking for a definition for it.

The strategy for determining the optimal value is the following. We start with a very low number of particles (10,50) and progressively higher the threshold, till its increase has no more influence on the mapping process. An optimal of 90 has been found for now, given the particles of row 1 in Table 2.

What has been noted is the lower this **range threshold**, the lower is also the range in which the **grid mapping** is performed.

Table 2: Number of particles variations

Particles number	Resulting map
min=10, max=50	

## 3 References

[1]: Efficient Sparse Pose Adjustment for 2D Mapping, K.Konolige, G. Grisetti