MagMap : Sled localisation and Trajectories

Jules BERHAULT, Quentin BRATEAU,
Paul-Antoine LE TOLGUENEC, Gwendal PRISER

15 décembre 2020

Présentation

Introduction

blabla

Thicksets : Mapping coverage

Thicksets

Thicksets

$$\forall [\![\mathbb{X}]\!] \in \mathbb{R}^n, \quad \exists (\mathbb{X}^{\subset}, \mathbb{X}^{\supset}) \in (\mathbb{R}^n)^2 :$$

$$[\![\mathbb{X}]\!] = [\![\mathbb{X}^{\subset}, \mathbb{X}^{\supset}]\!]$$

Vocabulary

$\mathbb{X}^{\subset}$ is the *subset bound* and correspond to the red area,

$\mathbb{X}^{\supset}$ is the *supset bound* and correspond to the orange area.

Figure 1 – Subset Supset

Viewing range

Set inversion problem

$$\mathbb{X} = f^{-1}(\mathbb{Y})$$

$$f(\mathbf{x}) = \sqrt{(x_1 - a_1)^2 + (x_2 - a_2)^2}$$

Parameters

$[a_1]$ and $[a_2]$ represent a box of $\mathbb{Y}$ bounding the magnetometer.

Algorithm

SIVIA : Set Inverter via Interval Analysis.

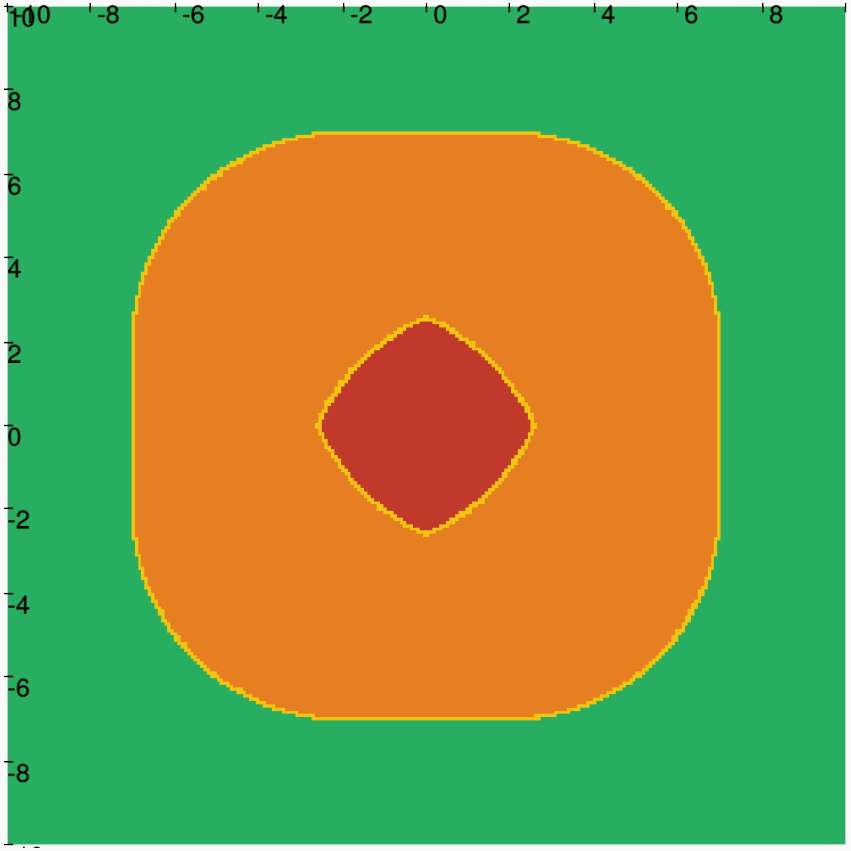

Figure 2 – Thicksets bounding the magnetometer measurement

Mapping coverage

Trajectory

$$\mathbb{X} = \bigcup_{t \in [t_0, t_f]} f_t^{-1}([0, r[)$$

The union of all patch give the mapping coverage.

Areas

Red area is the set seen for sure.

Orange area is the maybe seen set.

Green area is the not seen set.

Figure 3 – Mapping coverage along a trajectory

MagMap : Sled localisation and Trajectories

Jules BERHAULT, Quentin BRATEAU,
Paul-Antoine LE TOLGUENEC, Gwendal PRISER

15 décembre 2020