

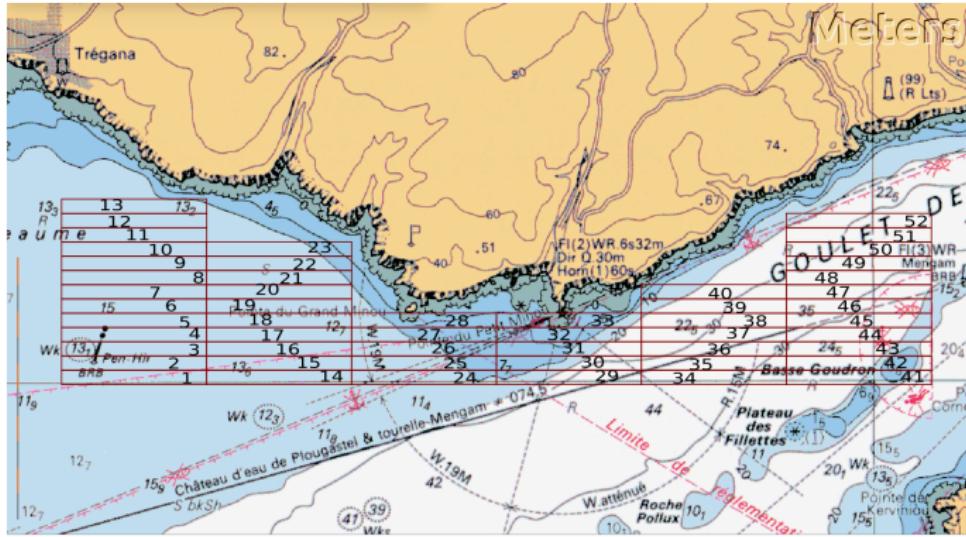
Ocean exploration with robots

L. Jaulin

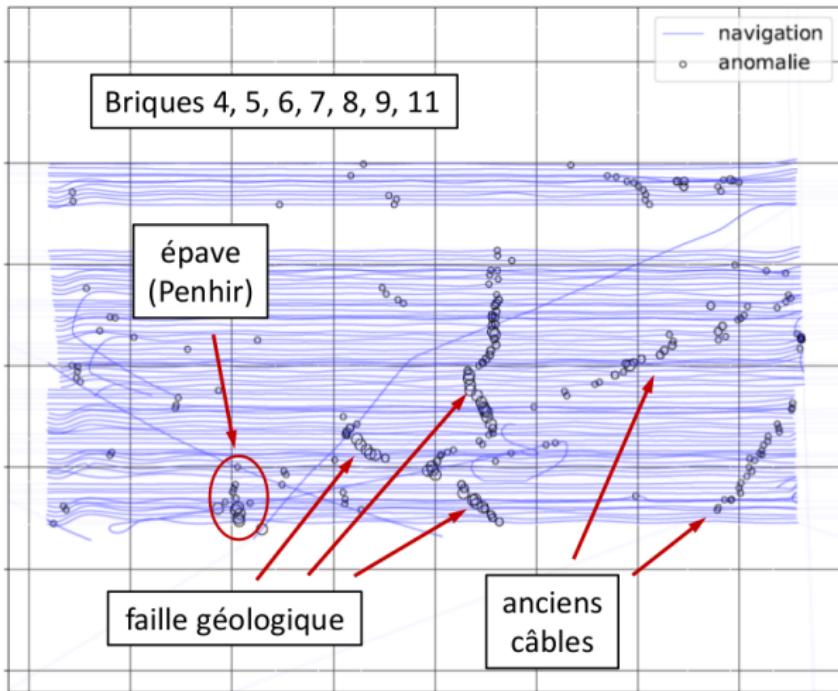
February 07, 2022,
Visite Thomas Sousselier



1. Marine robots to build maps





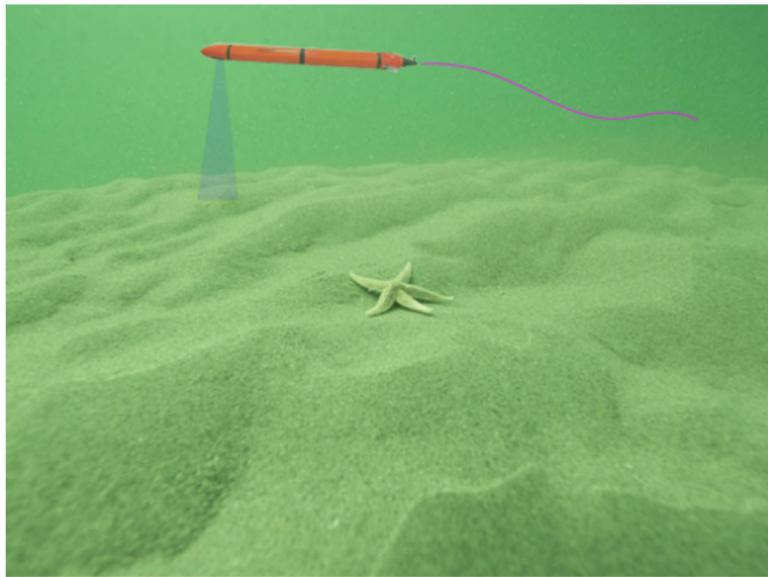


Magnetic map built in 2018

2. Cycle-based navigation

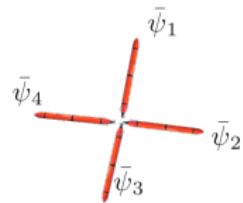
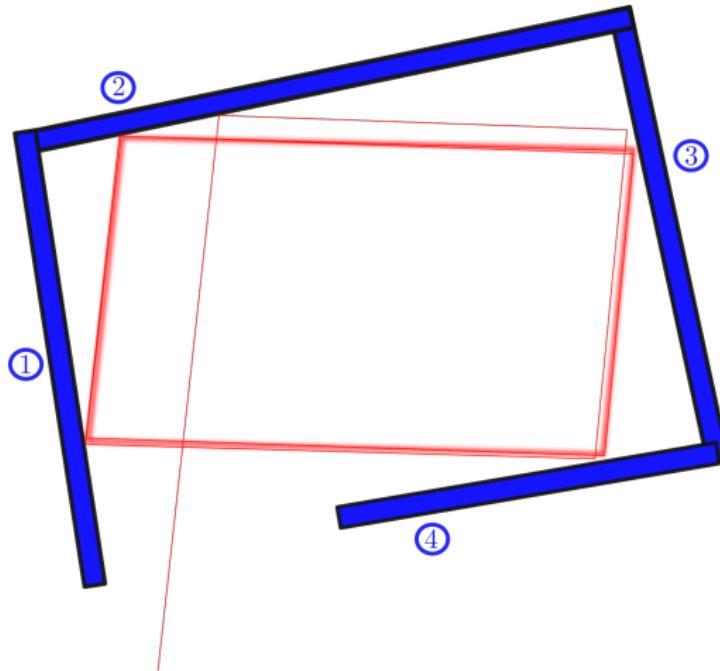


Submeeting 2018





youtu.be/TsvEUGa-XAs



Find the route without GPS, compass and clock

3. Tools for validation

Given

$$\begin{cases} \dot{\mathbf{x}} = \mathbf{f}(\mathbf{x}) \\ \mathbf{x}_0 \in [\mathbf{x}_0] \end{cases}$$

Interval methods allow us to find an envelope for $\mathbf{x}(t)$.

The screenshot shows a web browser window with the URL 'codac.io' in the address bar. The page title is 'Codac main page'. On the left sidebar, there are links for 'Try Codac online with Python', 'Installing the Codac library', 'Start a Python project', 'Start a C++ project', and a 'USER MANUAL' section containing links for 'Introduction', 'Basic structures for real values', 'Domains: sets of feasible values', 'Inclusion functions', 'Static contractors', 'Temporal contractors', 'Contractor Networks', and 'Set-inversion and separators'. The main content area has a heading 'Codac: constraint-programming for robotics'. Below it, a paragraph describes Codac as a C++/Python library for constraint programming over reals, trajectories, and sets, with applications in state estimation and robot localization. A sub-section titled 'What is constraint programming?' explains the paradigm where users state constraints on variables and a solver finds feasible solutions.

Codac main page

Try Codac online with Python
Installing the Codac library
Start a Python project
Start a C++ project

USER MANUAL

Introduction
Basic structures for real values
Domains: sets of feasible values
Inclusion functions
Static contractors
Temporal contractors
Contractor Networks
Set-inversion and separators

» Codac: constraint-programming for robotics

View page source

Codac: constraint-programming for robotics

Codac (Catalog Of Domains And Contractors) is a C++/Python library providing tools for constraint programming over reals, trajectories and sets. It has many applications in **state estimation** or **robot localization**.

What is constraint programming?

In this paradigm, users concentrate on the properties of a solution to be found (e.g. the pose of a robot, the location of a landmark) by stating **constraints on the variables**. Then, a solver performs **constraint propagation** on the variables and provides a reliable set of **feasible solutions** corresponding to the problem. In this approach, the user concentrates on **what** is the problem instead of **how** to solve it, thus leaving the computer dealing with the **how**.

An interval based library for verification in robotics