

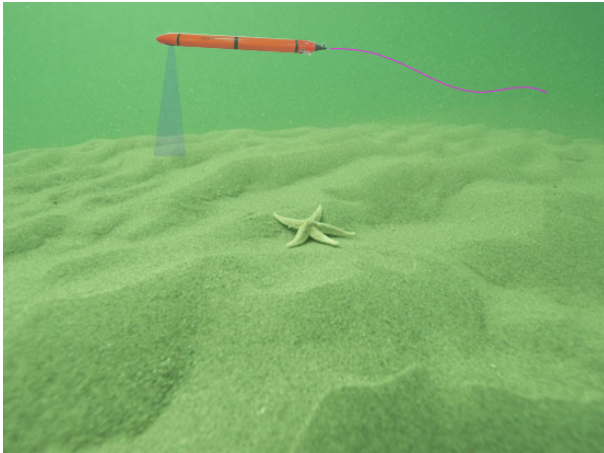
Explore and return with robots in a minimalist environment and with few computation

Luc Jaulin

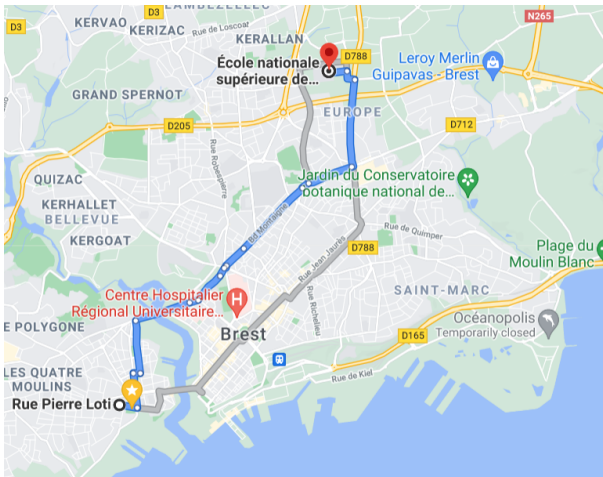


October 16-18 2024, ICROSSOD'24, Jerez, Cádiz, Spain

1. Navigation



Explore and return in a minimalist environment



Modern navigation: high cost (computation, infrastructure)

Route-based navigation



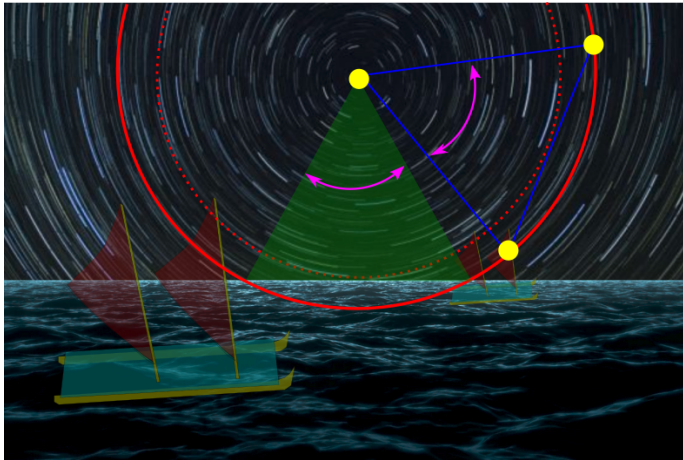
Submeeting 2018



Find the route without GPS, compass, clocks, computer with *wa'a kaulua*

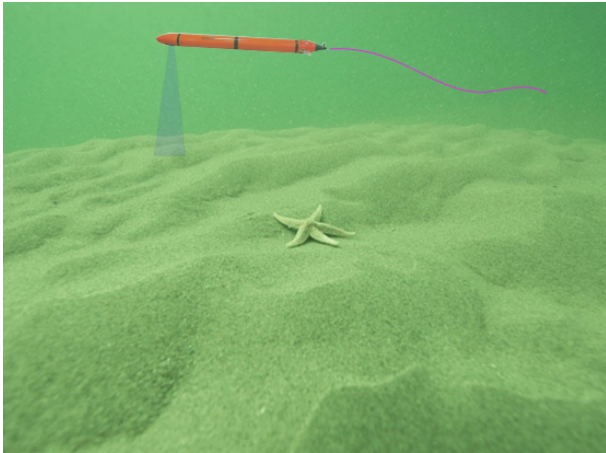
Follow a route

Given a function $h : \mathbb{R}^2 \mapsto \mathbb{R}$, a route is defined by $h(\mathbf{p}) = 0$.
 h could be the temperature, the radiation, the pressure, the altitude, the time shift between two periodic events.

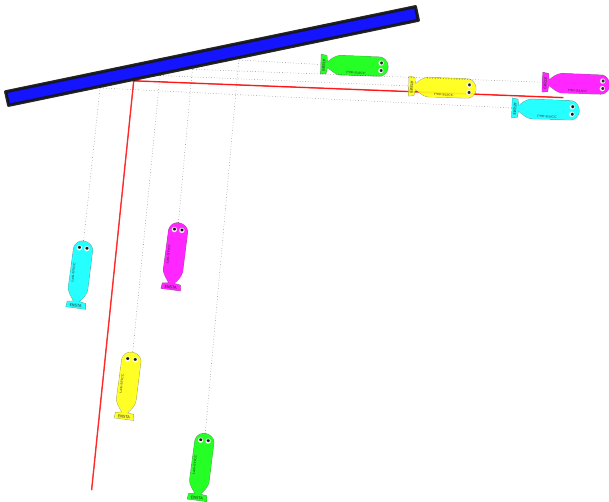


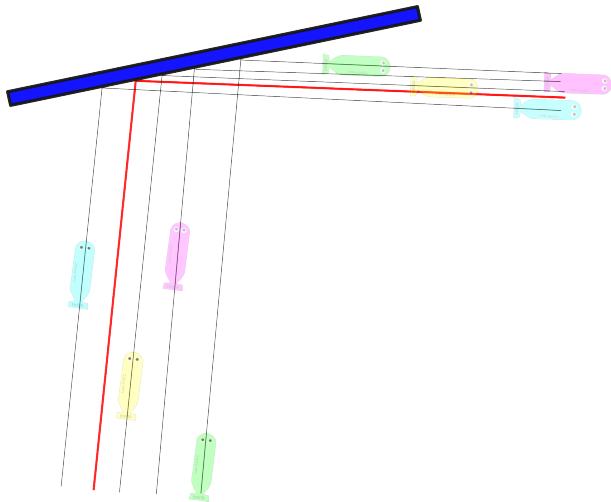
When one star sets the other rises

Stable bouncing (phd of Quentin Brateau)

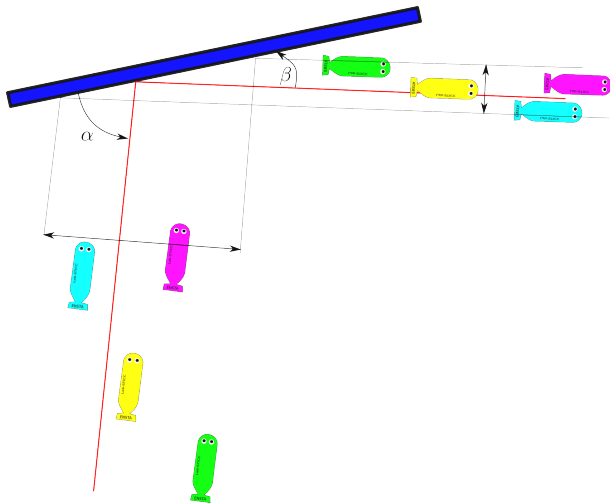


No route exists

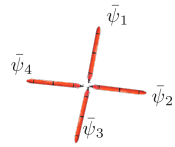
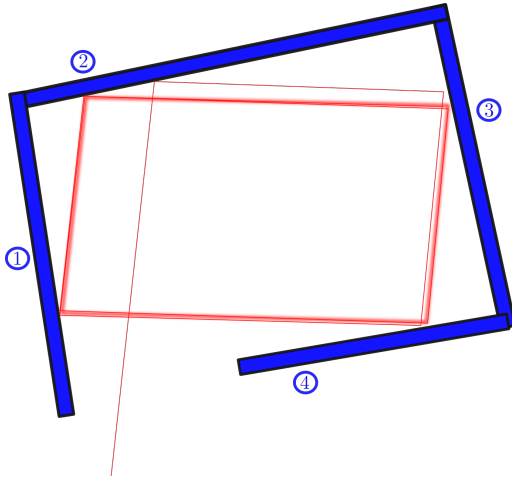


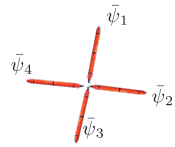
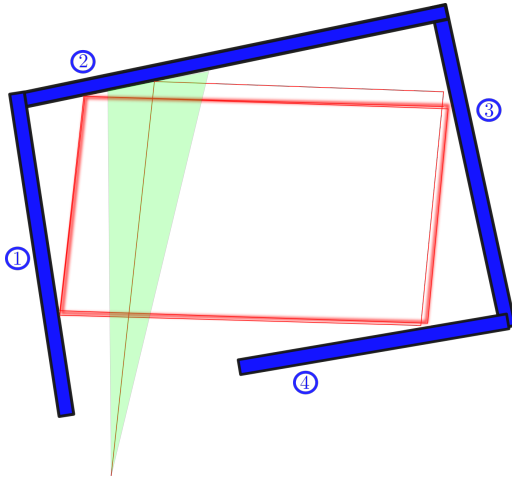


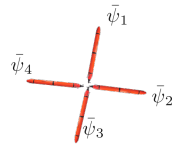
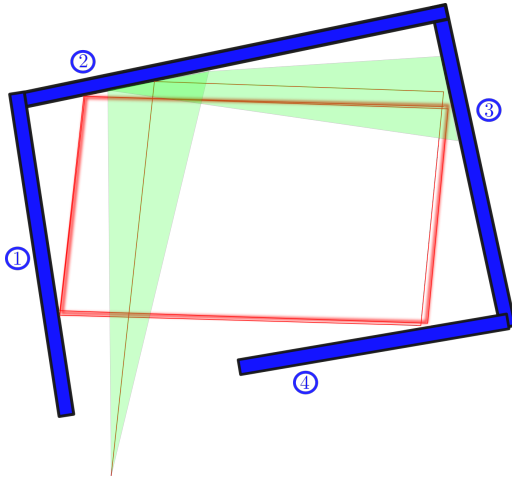
Contraction of the distance

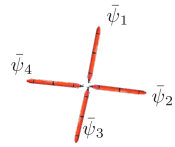
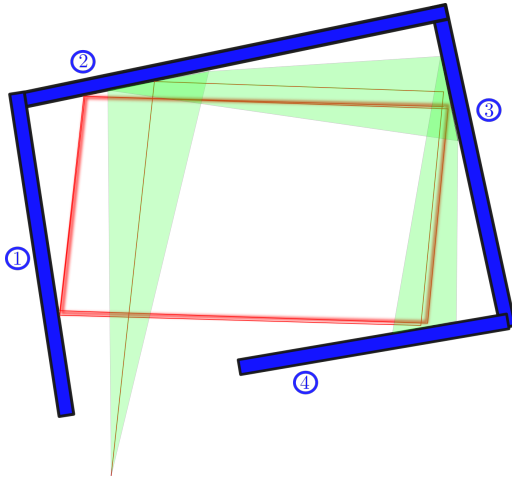


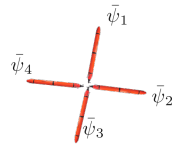
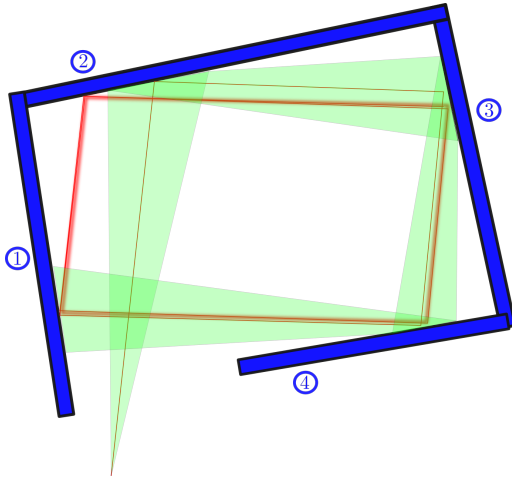
Stability criterion using Poincaré maps

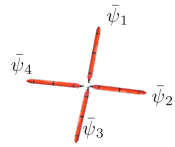
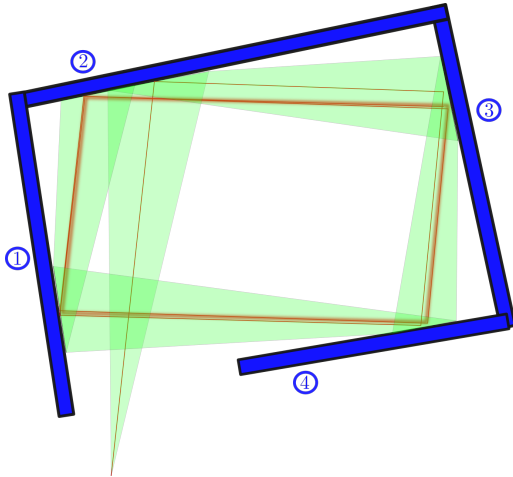


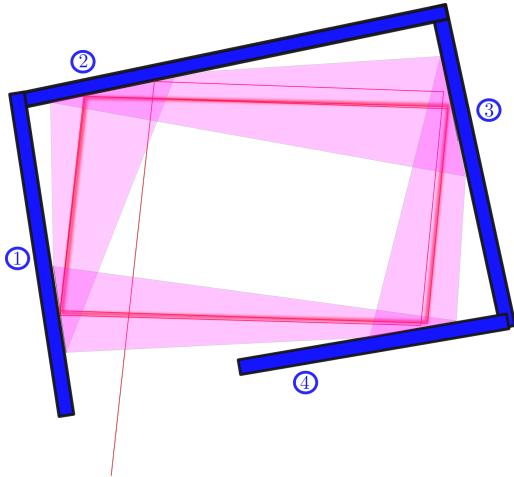


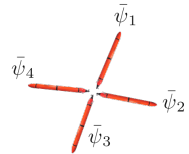
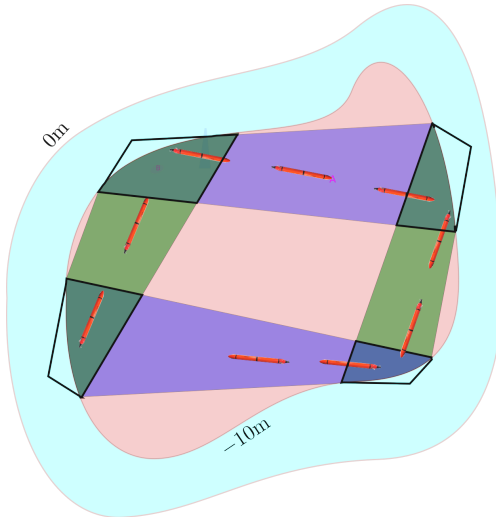


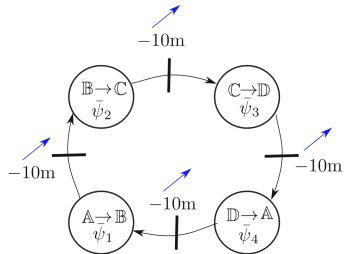
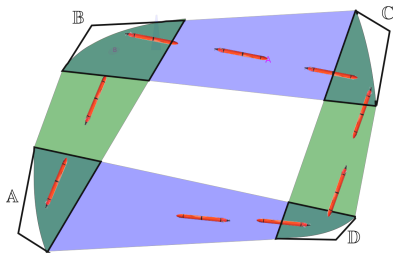






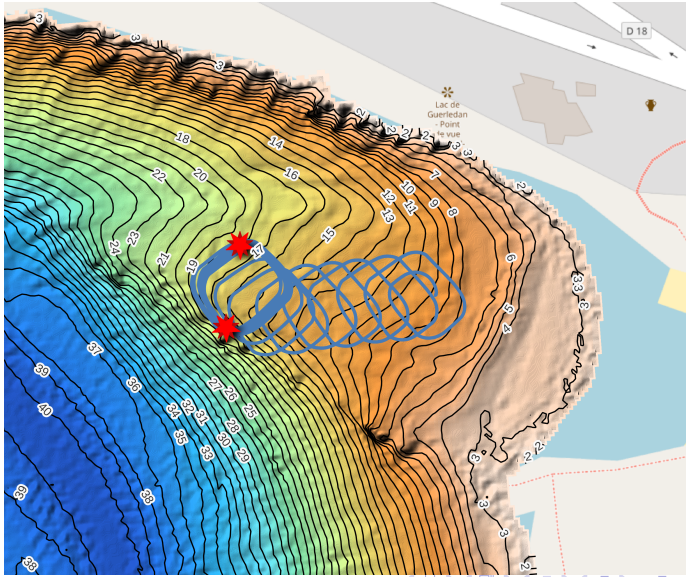










Experiment

Navigation
Stable bouncing
Experiment (Quentin Brateau)



References

- 1 Mobile robotic [2]
- 2 Route following [3][4]
- 3 Navigation with stable cycles [1]

-  Q. Brateau, F. L. Bars, and L. Jaulin.
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