

Exploration sous-marine autonome par la méthode des cycles stables

L. Jaulin

La robotique marine au service de l'observation
IUEM, Brest



Route-based navigation



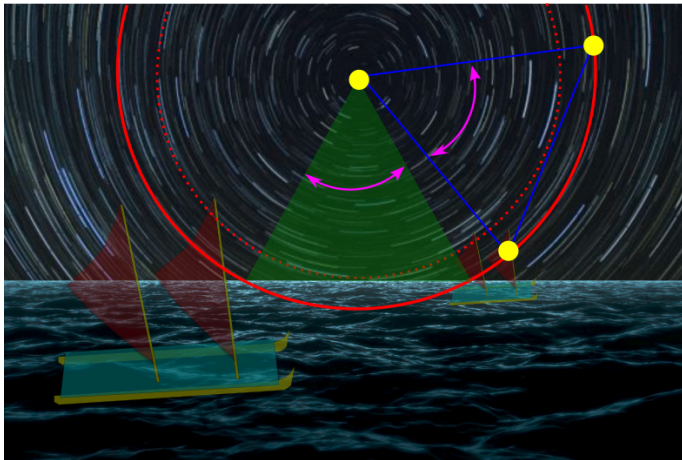
Submeeting 2018

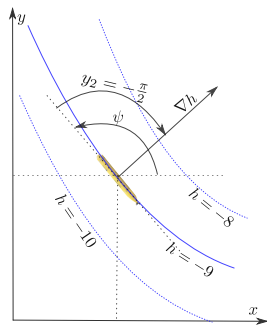
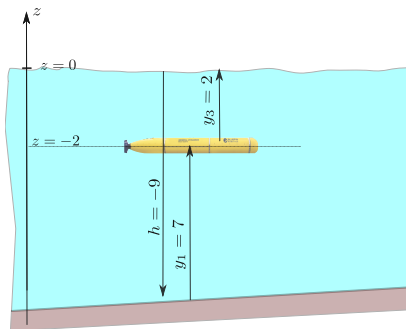


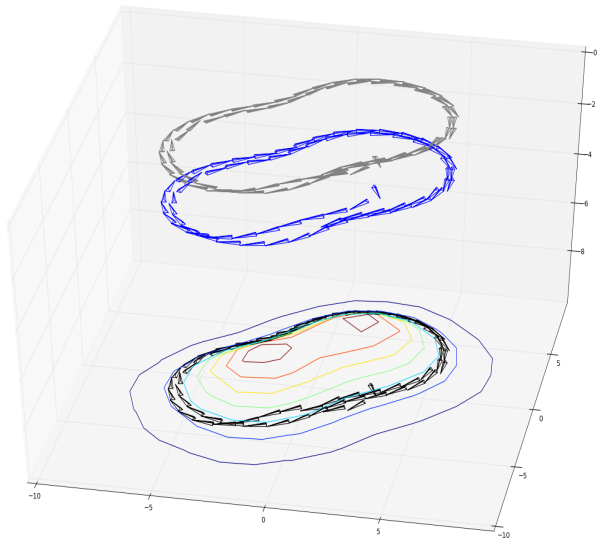
Find the route without GPS, compass and clocks with *wa'a kaulua*[4]

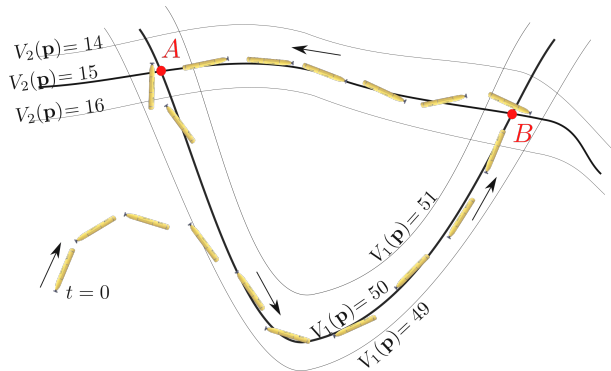
Follow a route

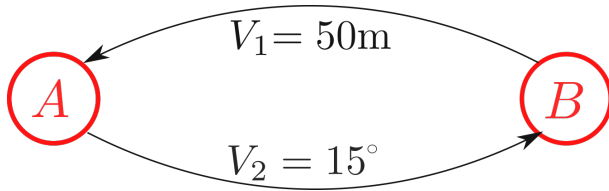
Given a function $h: \mathbb{R}^2 \mapsto \mathbb{R}$, a route is defined by $h(\mathbf{p}) = 0$.
 h could be the temperature, the radiation, the pressure, the altitude, the time shift between two periodic events.



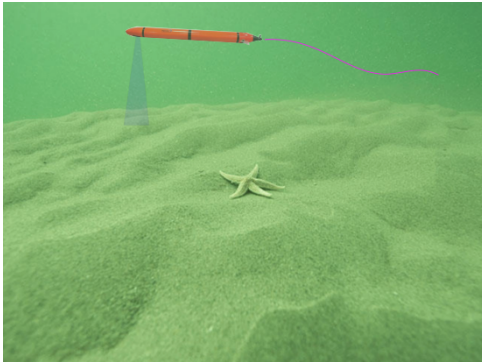




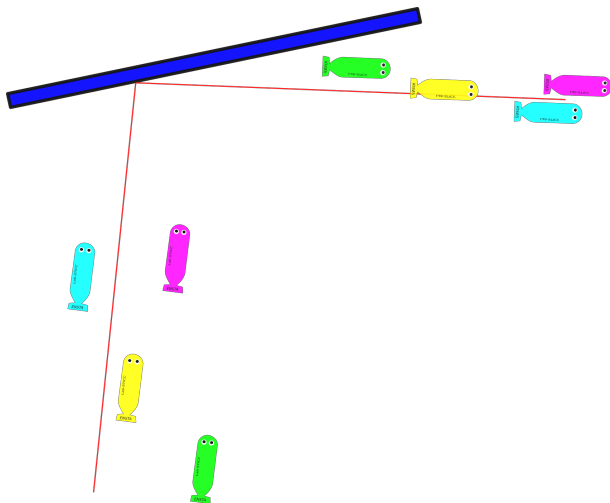


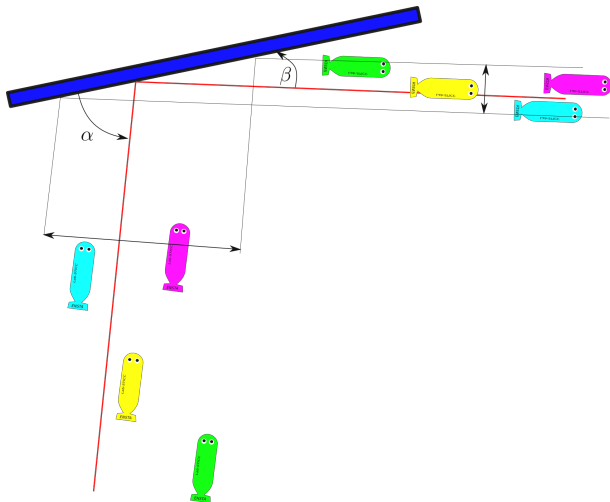


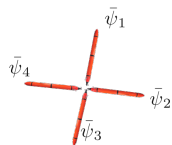
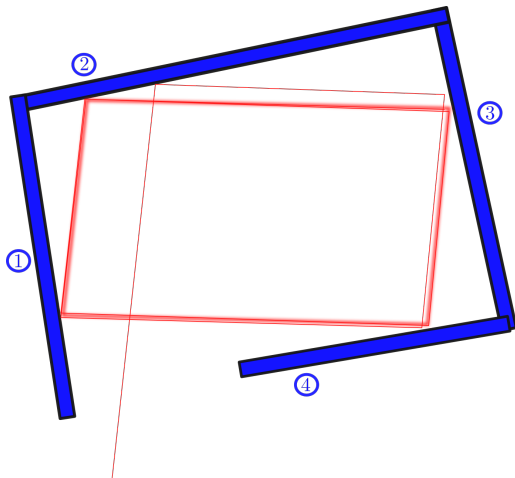
Stable cycles [3][1]

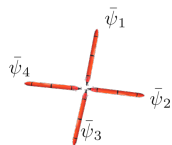
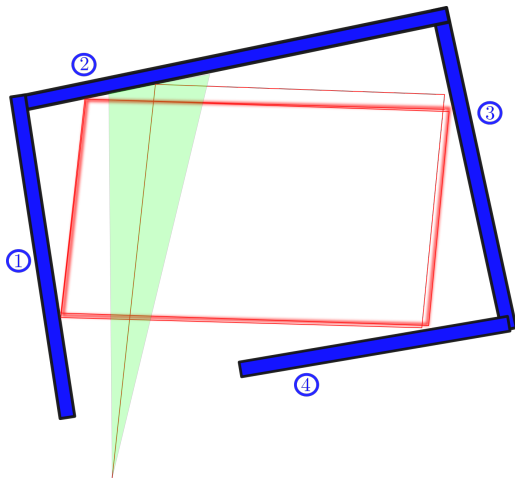


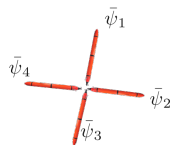
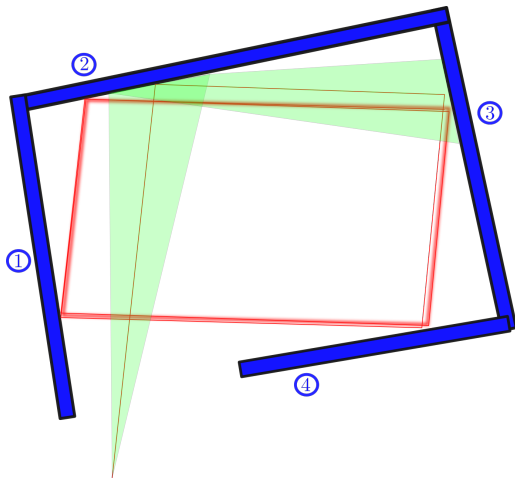
No route exist

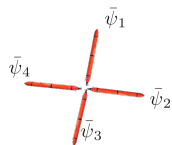
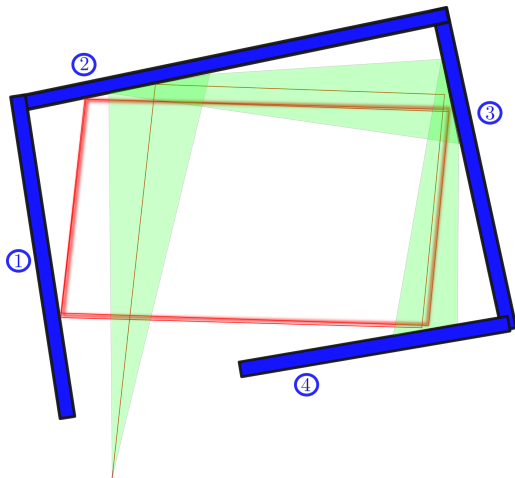


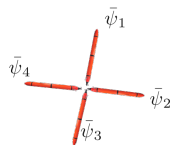
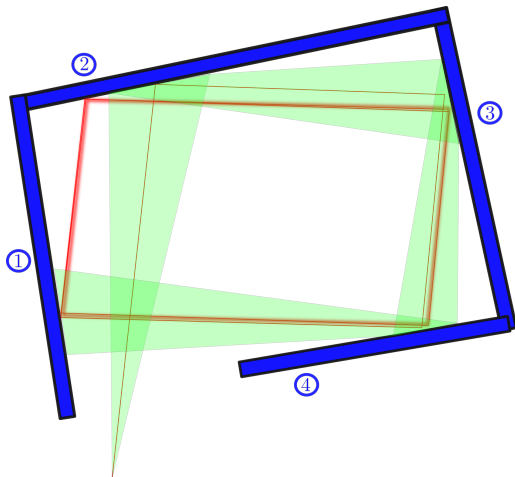


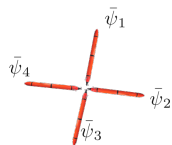
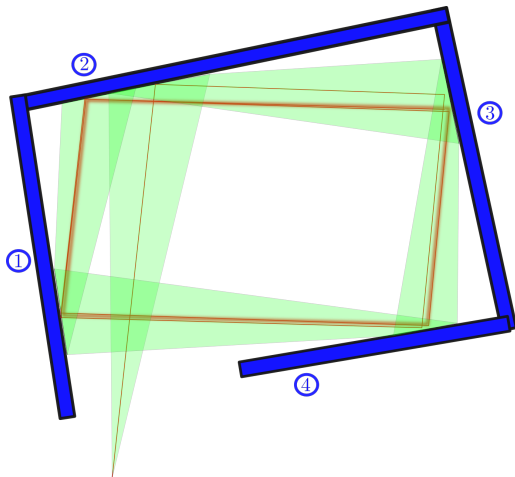


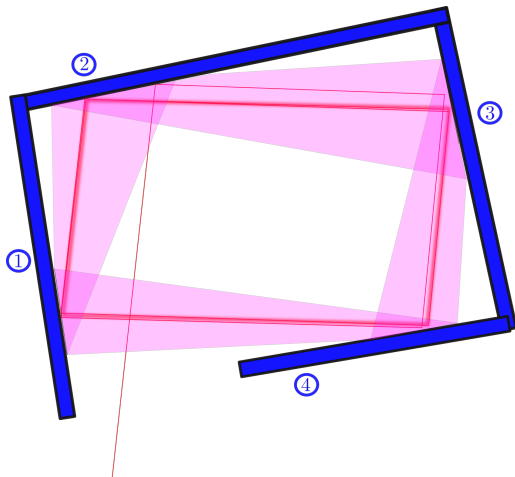


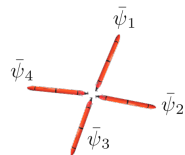
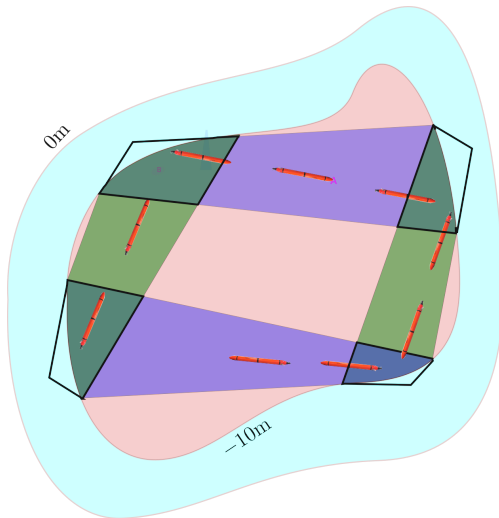


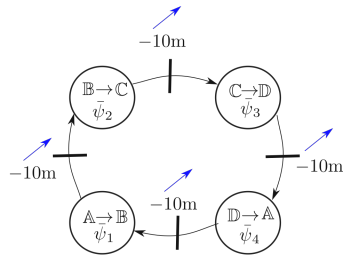
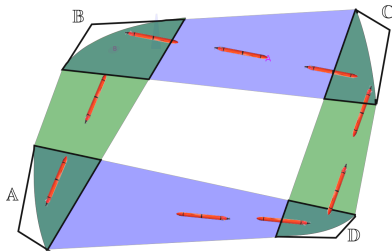










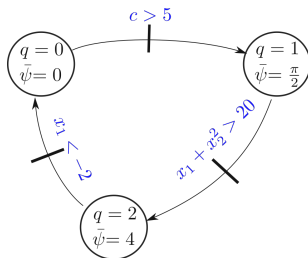


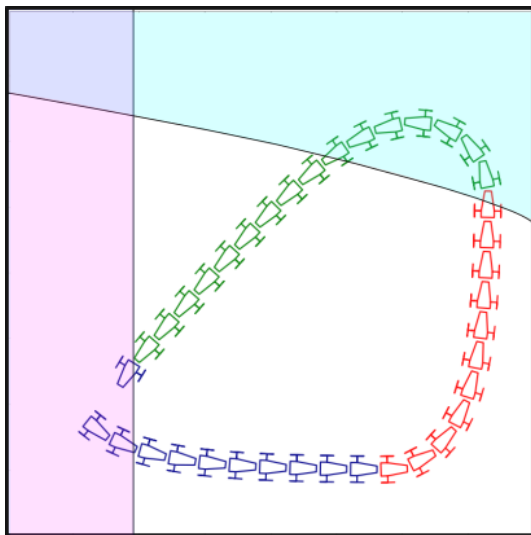
Test-case

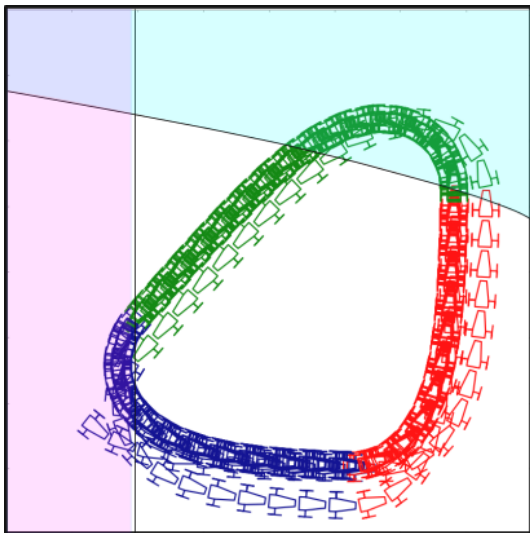
Consider the robot [2]

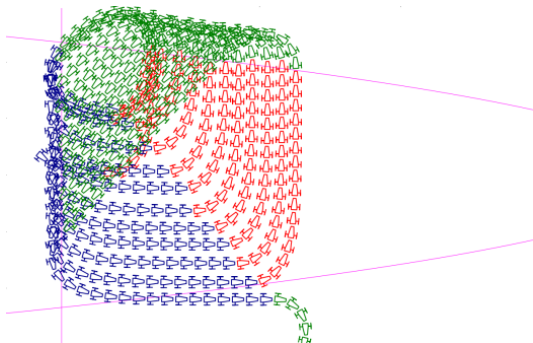
$$\begin{cases} \dot{x}_1 = \cos x_3 \\ \dot{x}_2 = \sin x_3 \\ \dot{x}_3 = u \end{cases}$$

with the heading control $u = \sin(\bar{\psi} - x_3)$.









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