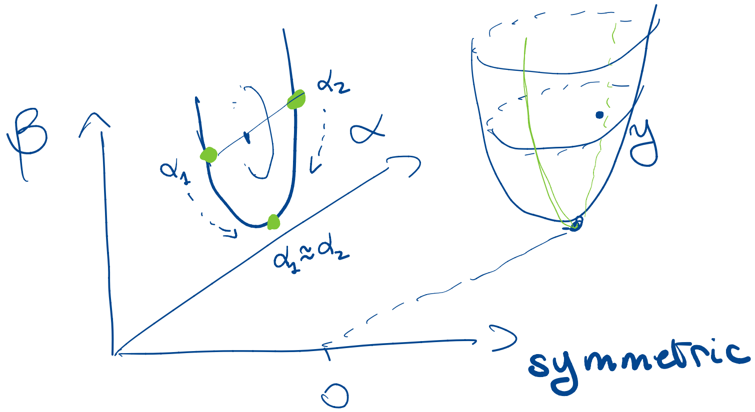


$$y = (a, \omega, \alpha, \beta, x, z)$$

with $x + a z$ a 2π periodic solution

to $\dot{x} = \omega f(\alpha, \beta; x)$

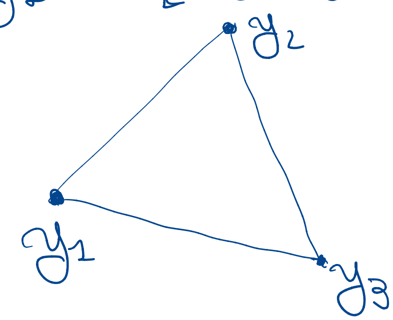
time rescaling

Idea: create simplexes on the solution surface

y_1, y_2, y_3 linearly indip.

and we validate $\Delta = y_1 + s_1(y_2 - y_1) + s_2(y_3 - y_1)$ with $0 \le s_1 + s_2 \le 1$

↳

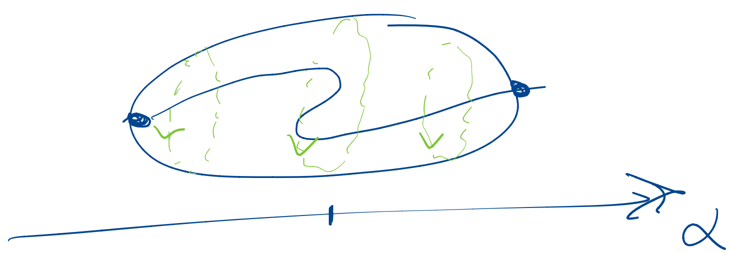


The problem statement:

$$\dot{x} = \omega f(\alpha, \beta; x) \longrightarrow \begin{cases} \dot{z} = \dfrac{\omega}{a} f(a, \beta; x + a z) \\ \|z\| = 0 \\ x \text{ interpolation of } (x_1^*, x_2^*) - \text{Hopf bif. equilibr} \\ \quad \text{for } \beta \end{cases}$$

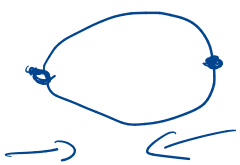
at α

× interpolation of the two Hopf bif to avoid problems such as saddles of the equilibrium branch



Problem: what happens for $\beta \to 0$? where the bubble crunches?

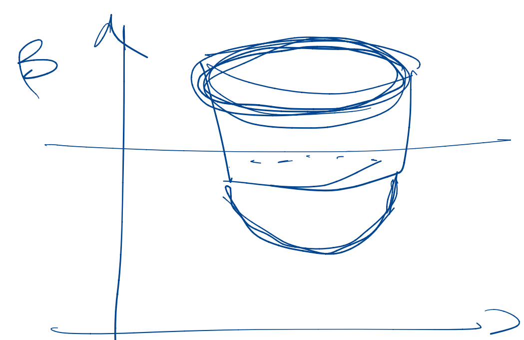
$a_2 = |x_1^* - x_2^*|$ $\qquad$ $a_2 \to 0$



I don't think we'd have problems with it

Practicalities: $\qquad$ Fewer dim in phase space

missing: proof of the bifurcation

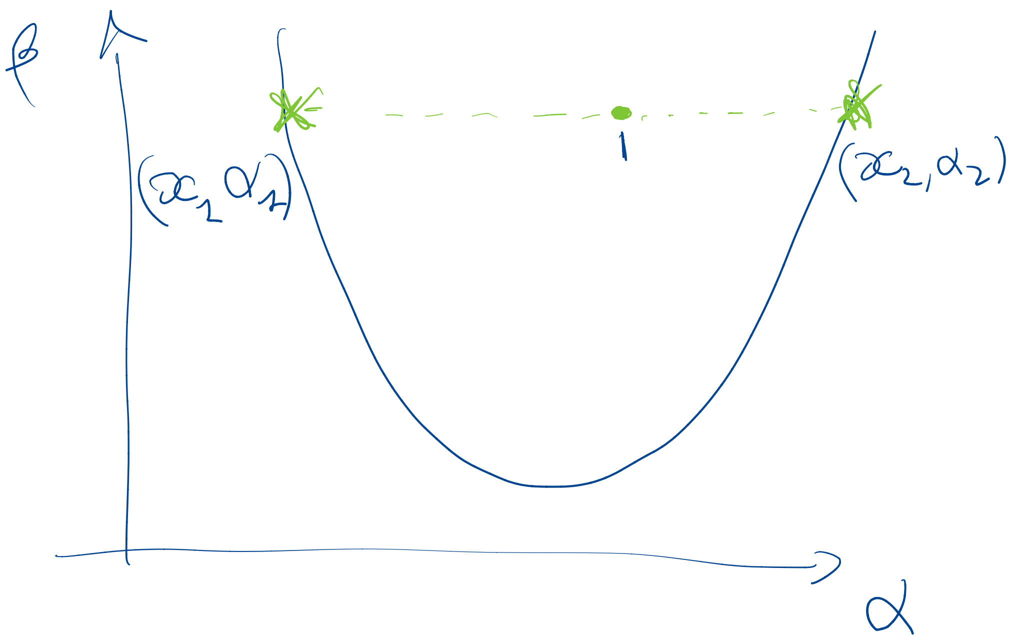


Idea: topological proof

the simplex complex is a "bowl" → bif. ∃

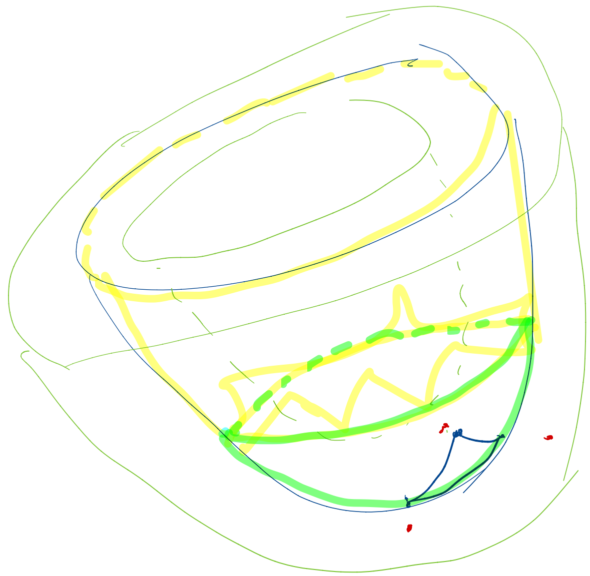
$\alpha, \beta \longrightarrow (a, \omega, x_2, x_2, d, z)$

$(a, \omega, x_2, x_1, \hat{d}, z)$

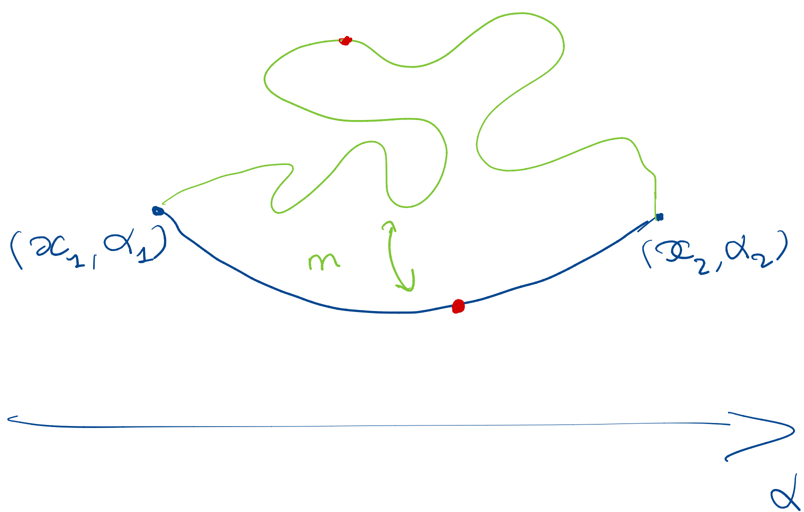


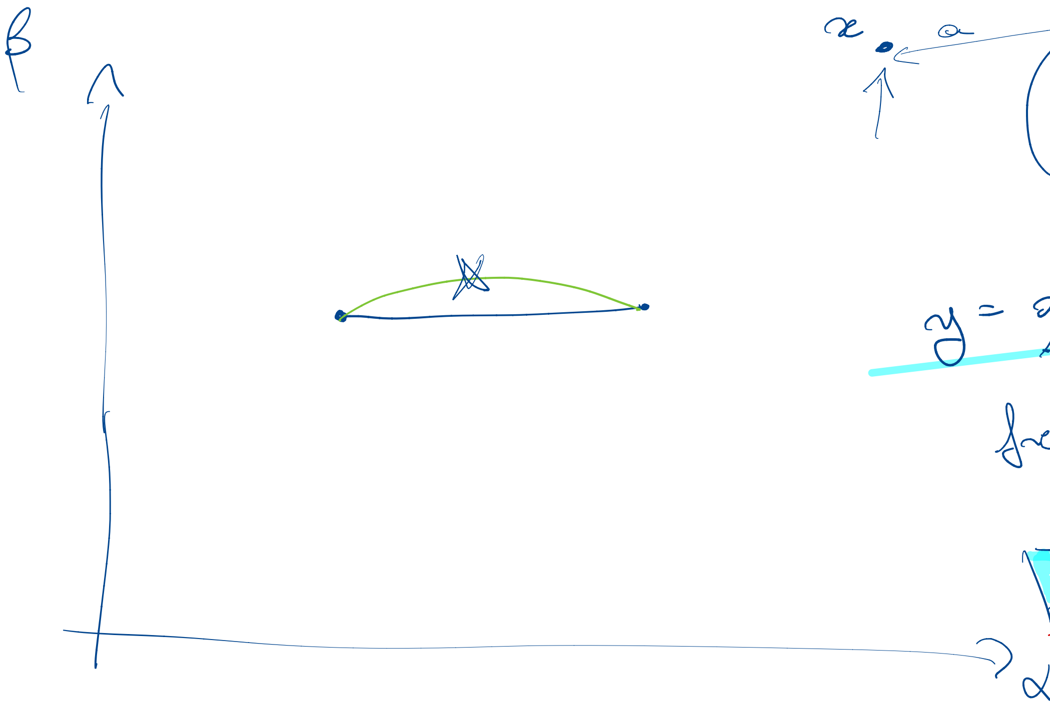
$\hat{x} = x_1 + d(x_2 - x_1)$

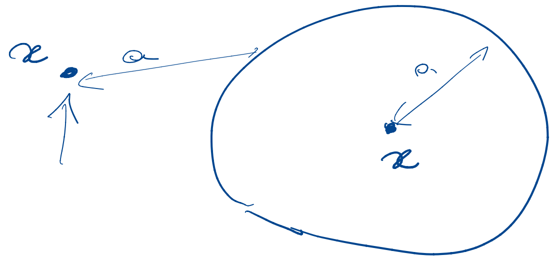
$d : \quad \alpha = \alpha_1 + d(\alpha_2 - \alpha_1)$



$f(x) = 0$

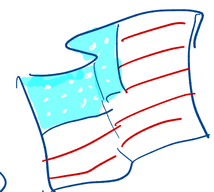






$$y = x + az$$

freedom!!



Plans

→ define 0-finding problem & formalize (EQ)

→ understand multi-parameter cont (K)

→ next: work on bounds

→ special set up for plan B (K)