Project 3 notes

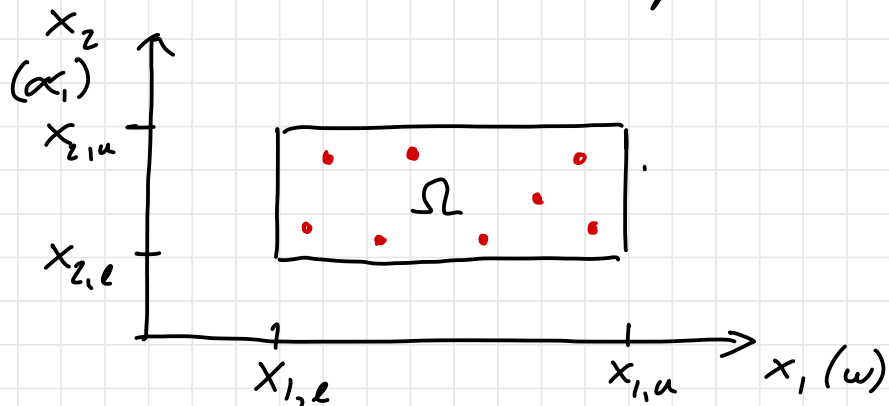# High-level Steps

1) make a fuction that, given $[w, \alpha_1, r_2]$, solves ODE (Eq 27) and returns $\sigma\left(\frac{d\phi}{dt}\right)$
   $\rightarrow$ And Verify it!!

2) In a script, generate samples of the design vars. (w, α_1, r_2) and evaluate obj.

3) Use GPML to create the surrogate

4) use surrogate in optimization

Sampling

Method 1: samples are scaled to lie within the true (physical) feasible space

Method 2: samples are in uniform $[0, 1]^3$ space and they are transformed inside the objective.
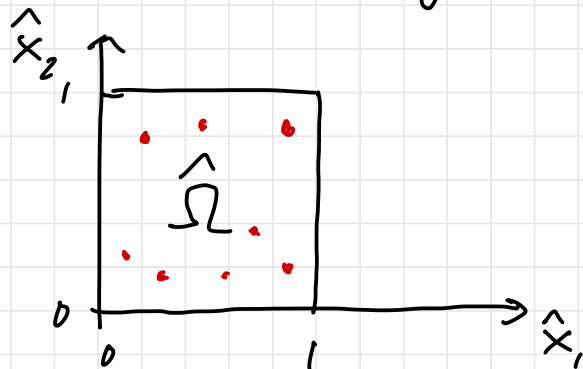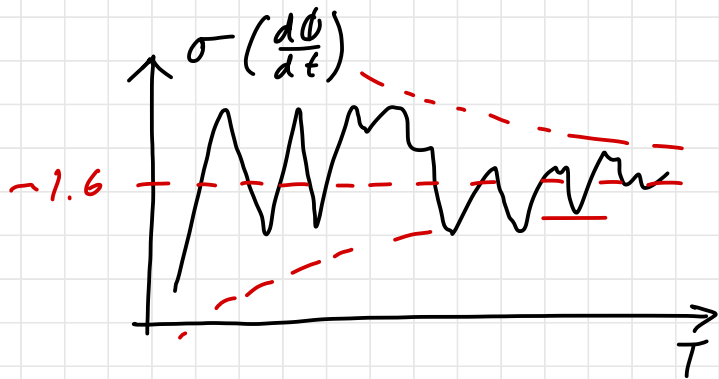
Example of how to transform between the two feasible spaces:

$$\hat{x}_1 = \frac{(x_1 - x_{1,\ell})}{(x_{1,u} - x_{1,\ell})} \quad , \quad x_1 = \hat{x}_1 (x_{1,u} - x_{1,\ell}) + x_{1,\ell}$$

How do I choose T?

Simulate the nominal design for a range of T.

$\sigma\left(\frac{d\phi}{dt}\right)$

~1.6

T

How do I choose the initial values for the GPML hyperparameters?

$\sigma\left(\frac{d\phi}{dt}\right)$

1.8

noise

sigma

mean

ℓ

0.4

0.3

0.6

0.9

ω