

Numerical Optimization

CENG-597

Project Status Report

Muhammed Yasinhan Yaşar
255101123

Data Generation

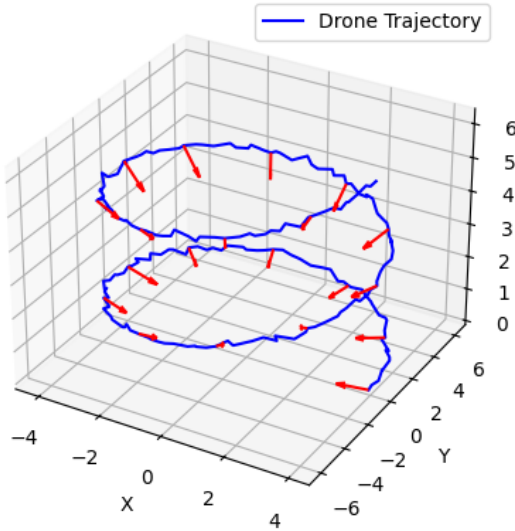


Figure 1: Drone Trajectory

I achieved to generate the **synthetic noisy** data to simulate realistic drone motion. Here the parameter values used:

$r_x = 4 \rightarrow$ radius along X-axis

$r_y = 6 \rightarrow$ radius along Y-axis

$h = 0.5 \rightarrow$ height_{step}/radian

$\theta \in [0, 4\pi] \rightarrow$ total trajectory angle

$N_\theta = 200 \rightarrow$ 200 steps resolution

$\sigma = 0.08 \rightarrow$ noise factor

Cost function is defined as follows:

$$J(p, n) = \sum_{i=1}^N \|p_i - y_i^p\|^2 + \sum_{i=1}^N \|n_i - y_i^n\|^2 + \lambda_1 \sum_{i=2}^{N-1} \|p_{i+1} - 2p_i + p_{i-1}\|^2 + \lambda_2 \sum_{i=2}^{N-1} \|n_{i+1} - 2n_i + n_{i-1}\|^2$$

Why it is defined in this way is clearly explained in the project itself (in the .ipynb files).

I calculated the gradient and the hessian of the **cost function** but I did **not** yet started to implement **optimization methods**.