

ZCE 111
Assignment 6

Q1

Download the data file, data_A6Q1.dat. Fit the data against the equation using **NonlinearModelFit**

$$y=A \exp[-B \sin^2x]$$

to obtain the best fit parameters for A and B . Using these best fit values of A and B , plot the function $y=A \exp[-B \sin^2x]$, and overlap it on top of the original data points to show that both fit nicely into each other.

Q2

Download the data file data_A6Q2.dat. It is a set of data for the displacement of a damped oscillator as a function of time. It is to be fitted by the equation:

$$y(t) = A \exp(-\zeta \omega_0 t) \sin[\sqrt{(1-\zeta^2)} \omega_0 t + \varphi]$$

Fit the data against this equation to obtain the best fit values for all parameters (e.g., A , ζ , ω_0 , φ)

Using these best fit values plot the function and overlap it on top of the original data points to show that both fit nicely into each other.

Q2 (cont.)

Using **FindMaximum** and **FindMinimum**:

Print out the coordinates of first minimum (i.e., the exact values of the first minimum of y , and the values of t where this occurs.)

Print out the exact coordinates of the second maximum around the value at $t=1.0$.

Q3

Download the file `data.dat`. It is a simulation data set for 10 particles moving in a 2D box for 5000 snapshots.

Import it and visualise the animation from the first frame until the last using **Manipulate**.