1 Model Function for Least Squares

You find three files with data on *StudIP* namely

- `5_Sheet_series_1`,
- `5_Sheet_series_2`,
- `5_Sheet_series_3`.

Use the template notebook `5_Sheet_Template.ipynb` to load the data and have a look at the plots. The first column of each data set contains values x and the second one observations y. The observations y have been generated by a pertubed model function f of the form

$$f(x) = \varphi(x)a + b \approx y,$$

where the parameters $a, b \in \mathbb{R}$ are unknown and φ is some function

$$\varphi = \begin{cases} x \mapsto e^x \\ x \mapsto x^2 \\ x \mapsto \sin(nx) \text{ for } n \in \mathbb{N}. \end{cases}$$

1. Consider each data set separately: Which function φ from the three choices above is appropriate to model the dependency in the respective data set?
2. After you have chosen the appropriate model function, solve the associated least squares problem for each data set (using `numpy.linalg.lstsq`) and plot your results.

Solution: