
Exercise - Introduction to Jupyter

Exercises in Data Modeling (190.021)

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This cheat sheet gives some additional information on how to use Jupyter notebooks.

1 Getting started with Jupyter Notebooks

Within these exercises, we use Jupyter notebooks to put the theory input from the lectures into practise. The provided Jupyter notebooks already contain some code that ensures that all functionalities are working as expected. Since this is a first-semester course, we do not expect you to already know how to write code. However, the code in these notebooks serves as the backbone for how these notebooks work. You do not need to understand the code to successfully complete the exercise, but all notebooks are designed to change some parameters in order to inspect changes in the results.

A Jupyter notebook, in general, combines declarative text with some code. After each code cell, you can find an output cell, where plots or values will be displayed after the code cell has been run. In this and all following notebooks, there are some values that you have to fill in. These cells are indicated by the text "TASK". Within these code cells, you always have to replace the value "None" with another value that is defined in the comment (# this is a comment) aside or in the task description.

To ensure to properly run your notebook, make sure to always run all code cells from top to bottom. To do so, either press the play button on the left of each code cell or press *shift+enter* or *ctrl+enter*.

2 Loading and Exploring Data

To get used to Jupyter notebooks, we will use data that contains thermal expansion measurement data for steel, aluminium, and copper at temperature ranging from 20°C to 120°C. The data has three different columns:

- Temperature (°C)
- Linear change (cm)
- Material Density (g/cm³)

Each metal is measured 25 times with small, normally distributed variations to simulate real-world variations. The data helps analyse how different materials expand with temperature and compare their properties.

After loading the data and plotting the data set, we want to make it possible to change the x_axis parameter in either "Length Change (cm)" or "Material Density (g/cm³)" to analyse the underlying relationship.