Introduction to computational thinking and programming for CFD (13251)

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Supplementary Material

Keywords and topics for the exam

1. Python modules
    - Import statement
    - Numpy
    - Matplotlib
2. Data
    - General and numerical data types
    - Number representation and accuracy
    - Data structures
    - Grids and gridded data
    - Data input
    - Data output to screen and file
3. Control structures and syntax
    - Conditional statements and branching
    - Loops
    - Recursion
    - Block
    - Comment
4. Functions
    - Formal and actual parameters
    - Positional and keyword arguments
    - Default values
    - Return values
    - Scope

5. Plotting
    - Line plot, scatter plot, bar plot, contour plot
    - Linear and logarithmic plot
    - Customization of the appearance
    - Limits
    - Labels
    - Title
    - Legend
    - Multiple data
    - Subplots
    - Saving ans displaying a plot
6. Numerical methods
    - Summation
    - Numerical integration
    - Quadrature rule
    - ODEs and solution procedure
    - Numerical differentiation
    - Finite difference method
    - Interpolation
    - Extrapolation
    - Discretization
    - Numerical errors
    - Initial and boundary conditions
7. Random numbers
    - Random number generation
    - True and pseudo random number
    - Uniform and non-uniform random numbers
    - PDF and CDF
8. Post-processing
    - Mean
    - Standard deviation
    - Variance
    - Statistical moment
    - Histogram
    - Sampling and binning