

Python for Scientific Computing 2

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1 Exercises

1.1 netCDF

Write a program that reads an XYZ file and writes all the data it contains to a netCDF file.

1.2 Matrices 1

Write a Python class `Matrix` that implements matrices using arrays for the internal representation. Provide addition, subtraction, and multiplication of matrices. Provide error checks for dimensional compatibility.

1.3 Matrices 2

Write subclasses of `Matrix` that implement row and column vectors.

1.4 Matrices 3

Add matrix inversion to your `Matrix` class. Use a Fortran or C routine of your choice to do the actual computations. Check for non-square and singular matrices.

1.5 Integrating external programs

Take a program of your choice that does some useful computation. Write a Python class that represents this program. Calling functions in this class should generate appropriate input for the program, run it, obtain the result, and return it in a form that is useful for Python programs. A user of your class should not need to know that an external program is used in the implementation.