

Homework 1 – Coding

Due: Thursday, January 20 – 10:00 am EST

Problem 1C: Installation, configuration and first steps [20 points]

1. Install Python 3 and verify that your version is ≥ 3.0 .
2. Install the packages *numpy* and *scipy* for Python 3.
3. Install Jupyter and start a notebook with Python 3. Perform the following tasks in this Jupyter notebook, which supports headings and, in markdown mode, even L^AT_EX. Use this to add interpretations and explanations.

- Add a cell with the following content and execute it:

```
from platform import python_version
print(python_version())
```

- Add a cell with the following content and execute it:

```
print( "HelloWorld!" )
print "HelloWorld!"
```

Explain why the second line triggers an error.

- Execute the following code in a cell. It uses the packages *numpy* and *scipy* for linear algebra:

```
# import numpy and the linear algebra tools in scipy
import numpy as np
import scipy.linalg as la
```

```
# create a matrix and a vector
M = np.array([[1,3],[2,8]])
v = np.array([[1],[2]])
```

```
# compute the product of M and v
print( "M*v:" )
print( str( M @ v ) + "\n" )
```

```
# compute the inverse of M
print( "M^-1:" )
print( str( la.inv(M) ) + "\n" )
```

- Extend the notebook to compute and print the matrix products $M \cdot M^{-1}$ and $M^{-1} \cdot M$. Compare the computed results with your expectation.
- Extend your notebook to solve the first two tasks of problem 1T.