

SymPy



Sci lab

Libre  
Mathematics

# Too General Terms

What kind of software?

- Numerical Analysis Software
- Computer Algebra Systems
- Statistical Software
- Logic Systems
- Hybrid Systems
- Misc.

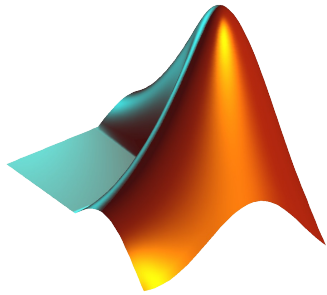
# Numerical Analysis

- Powerful “Matrix” datatype
- No mathematical function representation
- Powerful linear algebra tools
- Vectorization capabilities

# Numerical Analysis

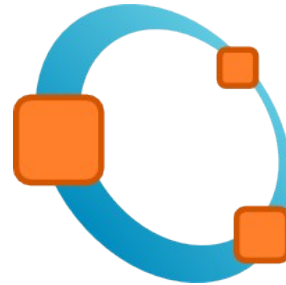
Major Non Free Solutions:

- MATLAB



Free Solutions:

- Octave
- Scilab
- NumPy



# GNU Octave

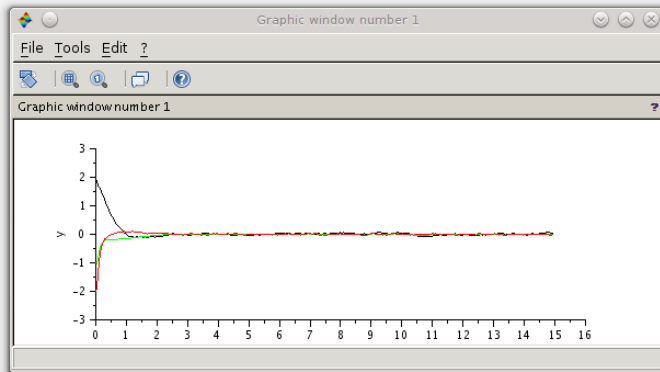
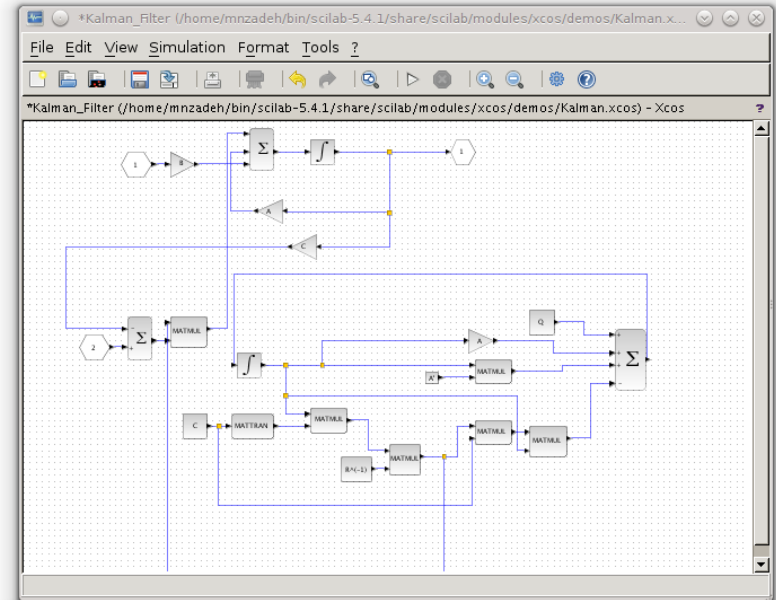
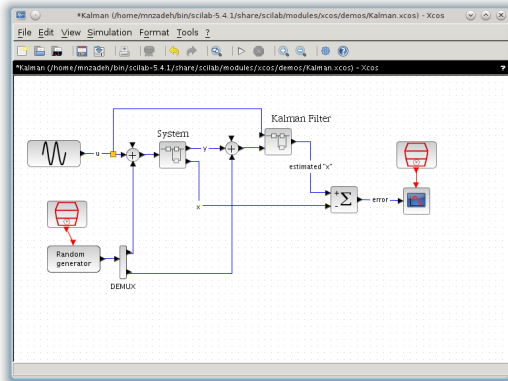
- Mostly MATLAB Compatible
- Active Community
- Good Documentation
- Plenty of extra packages (Octave Forge)
- No GUI for now (planned for version 3.7)



# Scilab

- Fairly MATLAB Compatible (Includes migrations tools)
- Educated Community
- Good Documentation
- Rich repo of extra packages (ATOMS)
- Good GUI
- Xcos (hybrid dynamical systems)
- Enterprise Support

# XCos



# NumPy

- Python Library
- Scipy integration
- Fast (using Cython)
- Great Documentation
- Very active community
- Supported in plenty of IDEs and python distributions





# CAS

- Nothing gets rounded(implicitly)
- Calculate integrations, limits, differentiations, etc analytically
- Behaves **symbolically**, with functions

# CAS

## Major Non Free Solutions:

- Maple

## Free Solutions:

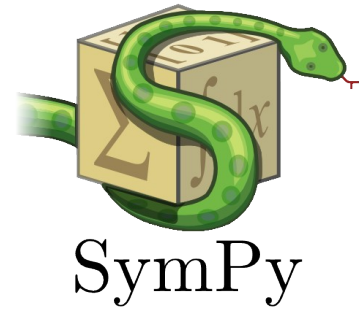
- Maxima
- Mathics
- SymPy



SymPy

# SymPy

- Python Library
- Mature and usable
- Embedable
- Integrated in various packages



# Mathics

- SymPy wrapper, with Mathematica syntax
- Web based GUI (No plugins needed)
- Optional Sage integration

# Statistical Software

Software to work with statistics and sometimes large datasets.

# Statistical Software

Major Non Free Solutions:

- SPSS



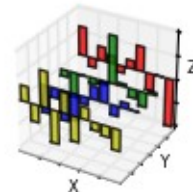
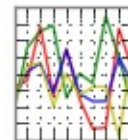
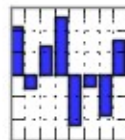
Free Solutions:

- R
- Pandas



pandas

$$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$$



# R

- Mature and reliable language
- Good Documentation
- Active Community
- Wide use in academy

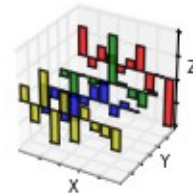
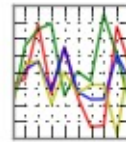
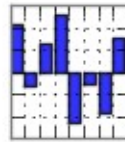


# Pandas

- Python Library
- Good Documentation
- Works nicely with other python moduls
- Can embed C and C++ code(unlike R)

pandas

$$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$$





# Logic Systems

Prolog language has several free implementations, including GNU Prolog.

# Hybrid Systems

Systems including numerical analysis tools, a computer algebra system, and maybe a logic system, are categorized as hybrid systems.

# Hybrid Systems

Major Non Free Solutions:

- Mathematica

Free Solutions:

- Sage



# Sage

- Python Language
- Wide range of tools available in one single API
- Web based GUI (No plugins)



# Misc.

There are some special purpose tools, e.g. software to work with Graphs, or software dedicated to plotting.

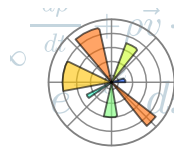
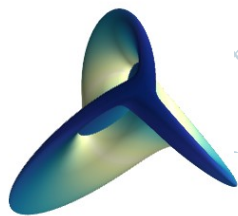
# Misc.

Major Non Free Solutions:

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Free Solutions:

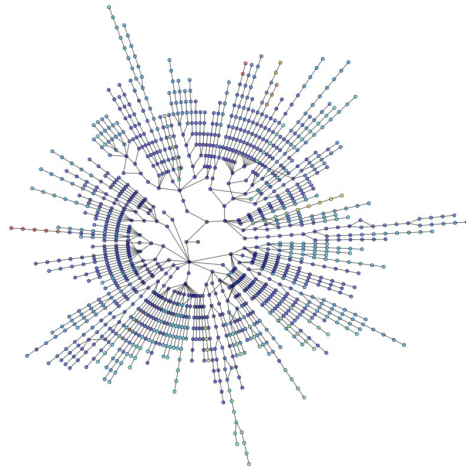
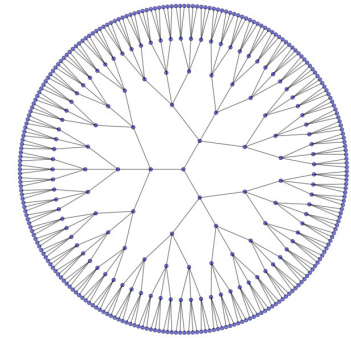
- NetworkX
- Matplotlib
- MayaVi



matplotlib

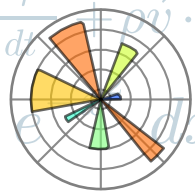
# NetworkX

- Python library to work with Graphs
- Social Network Capabilities
- Graphviz integration
- Very fast and efficient



# Matplotlib

- Python Plotting Library
- Fast and Easy to use
- Minimal Dependencies

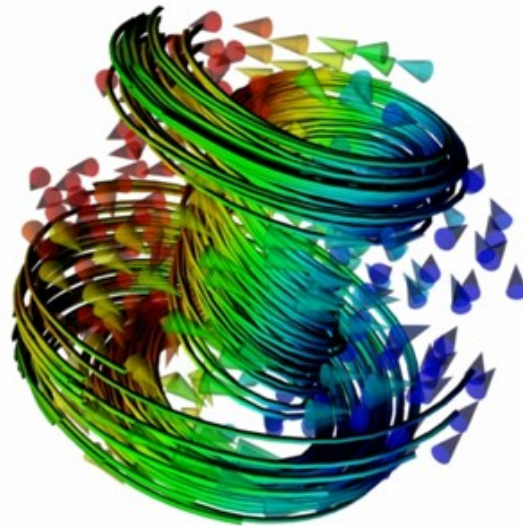
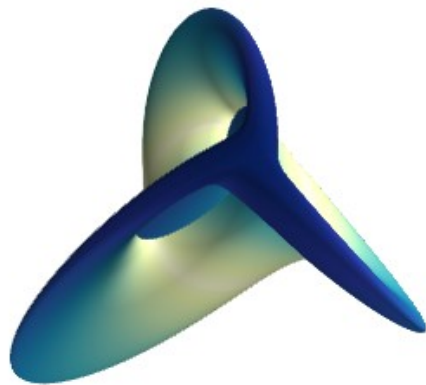


matplotlib



# MayaVi

- Feature Rich Python Plotting Library
- Fast 2D and 3D plotting
- Commercial Support



# Any Questions?

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Remember, science loves Python



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