
FOS Scientific Tools Documentation

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This document provides a list of Free and Open Source Tools tailored to scientific and engineering usage for all fields. You are welcome to contribute. Each tool should have the website, purpose and a description as a descriptive list. Hardware tools are also welcome.

1.1 General Tools

1.1.1 Python

Website <https://docs.python.org/3/>

Purpose Programming Language, Software

Description Python is a programming language which is heavily used by scientists and engineers. There are many packages and modules out there, which implement a lot of libraries about all topics and all of those are at your finger tips at <https://pypi.python.org/>.

1.1.2 GNU Octave

Website <https://www.gnu.org/software/octave/>

Purpose Programming Language, Numerical Computation, Software

Description GNU Octave is a numerical computation tool which behaves pretty similar to Matlab. It comes with many toolboxes which are focused on specific areas like image processing. It also provides a programming language, so you are able to develop your own algorithms.

1.2 Electrical and Electronics

Todo:

- raspberry pi
- Cogenda TCAD
- Paragon <http://mixedsignal.eleg.uark.edu/paragon.html>

- Tiburon RTE tiburon-da.com
- ADMS [http:// mot-adms.sourceforge.net](http://mot-adms.sourceforge.net) [http:// mot-zspice.sourceforge.net](http://mot-zspice.sourceforge.net)
- i-mos
- mapp
- valint
- parameterization
- ngspice
- xyce
- gnuicap
- asap - antenna scatterers analysis programm
- ataitec free 2d field solver
- atlc arbitrary transmission line calculator
- atlc2
- emanalyze
- emap
- emcos antenna vlab sv
- em explorer
- emgine environment
- ermes
- fastcap
- fasthenry
- feko lite
- femm finite element method magnetics
- gprmax
- magnet
- mmana-gal
- meep
- mmtl
- multiple multipole (mmp) algorithms
- nec2
- new fasant
- pdnmesh
- puma-em
- qsci
- radia
- sate static field analysis toolkit

- students quickfield
 - sonnet lite
 - trace analyzer
 - kicad
 - Profile <http://profile.ewi.tudelft.nl/> <http://sourceforge.net/projects/profile2d>
-

1.2.1 Circuit Simulation

Quite Universal Circuit Simulator (Qucs)

Website <http://qucs.sourceforge.net/>

Purpose Circuit Simulation, Software

Description Qucs is an integrated circuit simulator which means you are able to setup a circuit with a graphical user interface (GUI) and simulate the large-signal, small-signal and noise behaviour of the circuit. After that simulation has finished you can view the simulation results on a presentation page or window.

1.2.2 TCAD

openEMS

Website <http://openems.de/>

Purpose FEM

Description openEMS is a free and open electromagnetic field solver using the FDTD method. Matlab or Octave are used as an easy and flexible scripting interface.

DEVSIM

Website <https://www.devsim.org/>

Purpose Technology Simulation, FEM

Description DEVSIM is semiconductor device simulation software which uses the finite volume method. It solves partial differential equations on a mesh. The Python interface allows users to specify their own equations.

Elmer

Website <https://www.csc.fi/web/elmer/>

Purpose FEM

Description Elmer is an open source multiphysical simulation software mainly developed by CSC - IT Center for Science (CSC).

1.2.3 Measurement Equipment

EspoTek Labrador Board

Website <http://espotek.com/labrador/product/espotek-labrador-board/>

Purpose Hardware, Oscilloscope, Waveform Generator, Power Supply, Logic Analyzer, Multimeter

Description Labrador is an all-in-one tool for electronics students, makers and hobbyists. It includes functionality like Oscilloscope, Waveform Generator, Power Supply, Logic Analyzer, Multimeter.

CHAPTER 2

Indices and tables

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