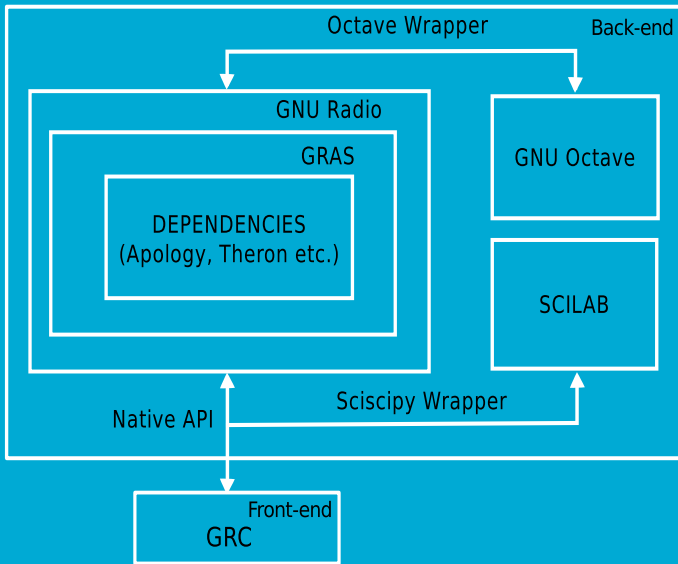


Introduction to Sandhi

Sandhi is a **free and open source** visual programming language and editor. It can perform experiments that would otherwise require LabVIEW. It is developed using GNU Radio with GRAS scheduler.

Sandhi is capable of supporting feedback systems and its framework is flexible enough to enable users to design and simulate their own set of experiments. It also has a provision to connect external hardware devices (such as SBHS, bioreactor) by using serial port.

Architecture



Features of Sandhi

- It has interactive and user friendly GUI
- User can design customized blocks using Python, C++
- Supports connections to external hardware devices
- Performs scientific calculations using Scilab and Python
- Generates control system data flow graphs
- Auto-checks if connections are correct

- Outputs are shown in the form of graphs/ calculated values
- Inputs can be changed in run time with the help of sliders

Applications

Virtual Labs is a project that is run in a collaborative mode across India. To achieve the goal of shifting to Open Source, Sandhi is offered to the Virtual Labs team. Experiments developed at many IITs for Virtual Labs have been shifted to Sandhi from LabVIEW.

• Magnetic Levitation (Maglev):

The Magnetic Levitation (Maglev) unit demonstrates closed loop levitation of permanent and ferromagnetic elements.

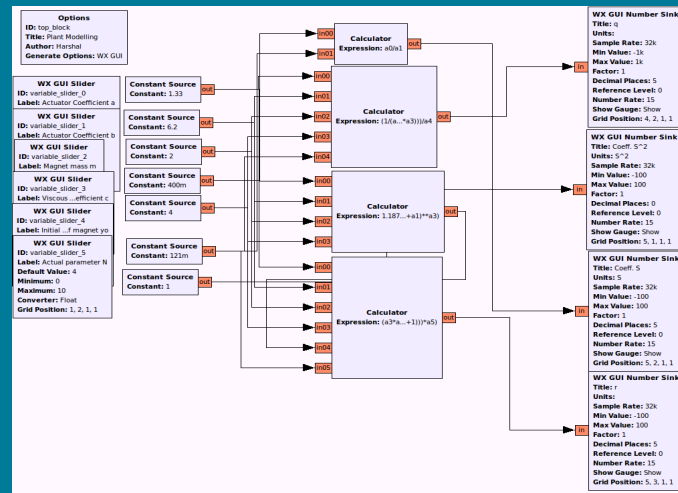


Fig 1: Frequency response flow graph

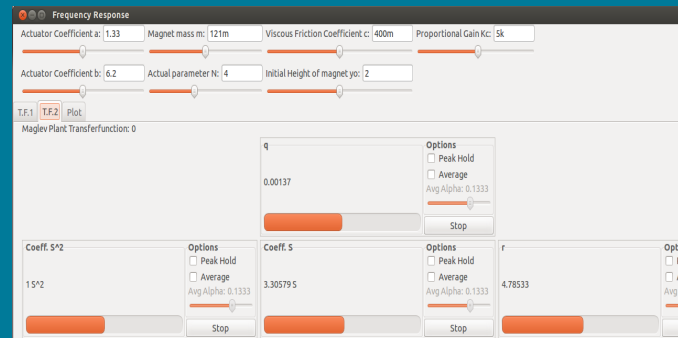


Fig 2: Frequency response output

• SBHS (Single Board Heater system):

It is a low cost lab-in-a-box setup to teach the basics of control and identification.



Current developments

- Optimisation of response time
- Migration of Labs to Sandhi
- Improvement of GUI

Future developments

- Sub-GRC calling: Output of one .grc will be input of another .grc file.
- Interfacing NI hardware with Sandhi.
- Hosting sandhi as a server.
- Automatic code generation.

About FOSSEE

FOSSEE (Free and Open Source Software for Education) project is funded by the National Mission on Education through ICT, MHRD.

The FOSSEE team works on 'Adaptation and development of Open Source simulation packages equivalent to proprietary software', and is based at Indian Institute of Technology Bombay.

Projects under FOSSEE

- Scilab
- Python
- FOSSEE Laptop
- DWSIM
- OpenFOAM
- Osdag
- eSim
- OR Tools
- OpenModelica