

PYTHON POWER ELECTRONICS

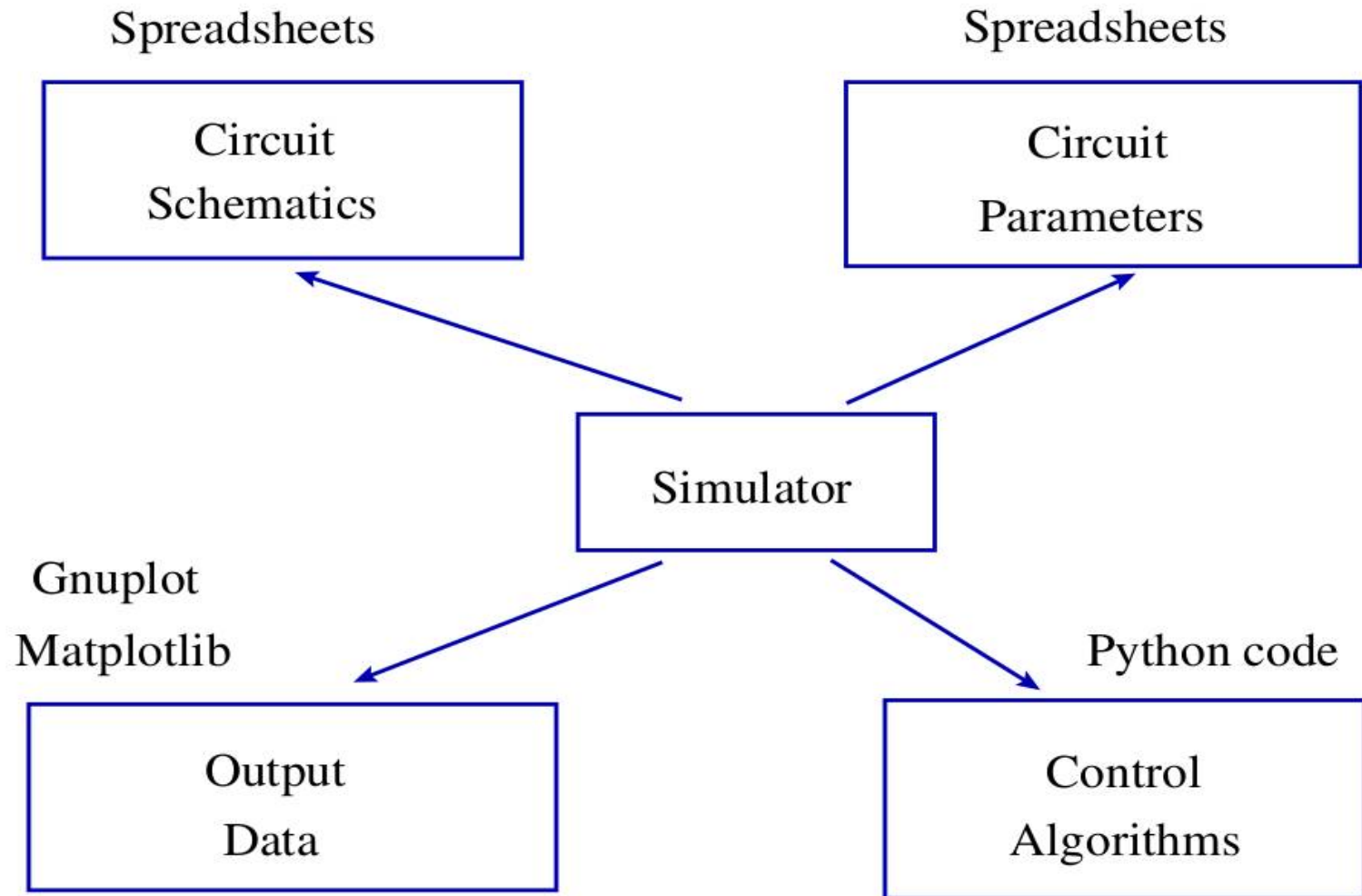
Open Source Circuit Simulator in Python

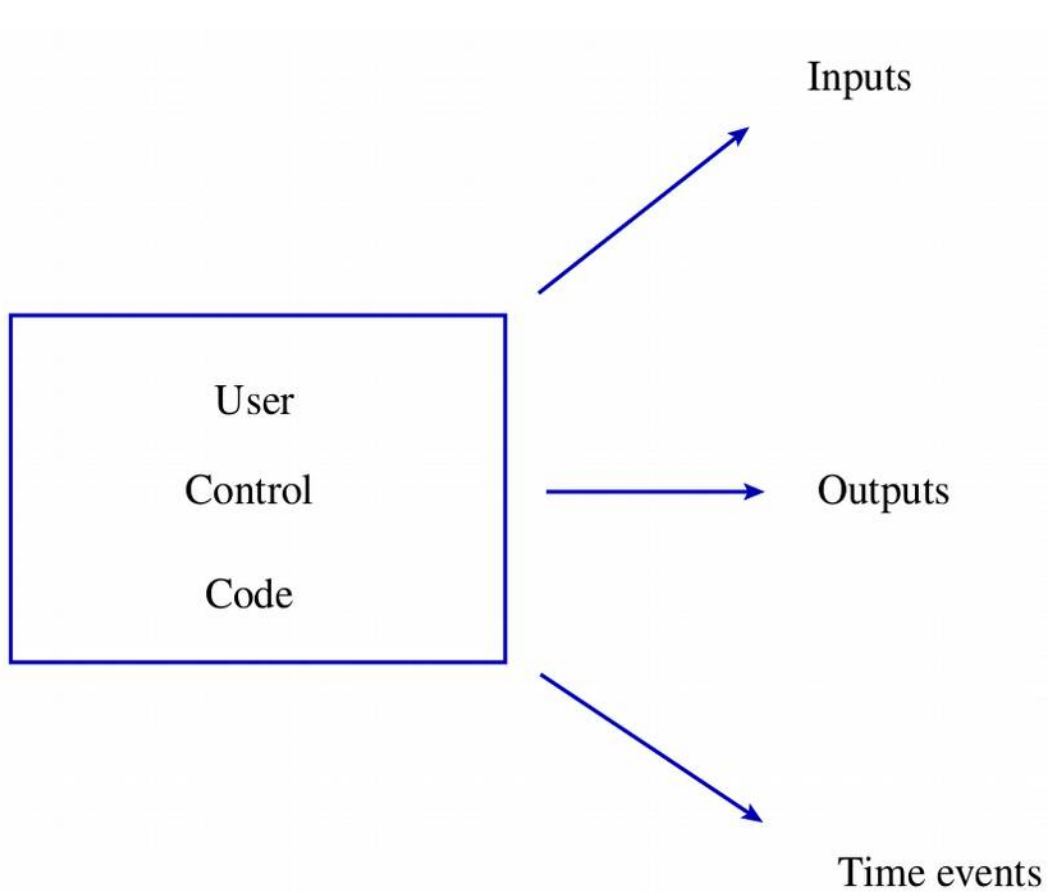
Shivkumar Iyer

PyCon Canada 2016, Toronto

Background

- Free and open source circuit simulator in an engineering field with very few affordable options
- Focused towards very large systems – wind farm.
- Found at
 - <http://pythonpowerelectronics.com/>
 - <http://pythonpowerelectronics.blogspot.ca/>
 - <https://www.facebook.com/pythonpowerelectronics>
 - pythonpowerelectronics@gmail.com





From meters in the circuit or from other control code

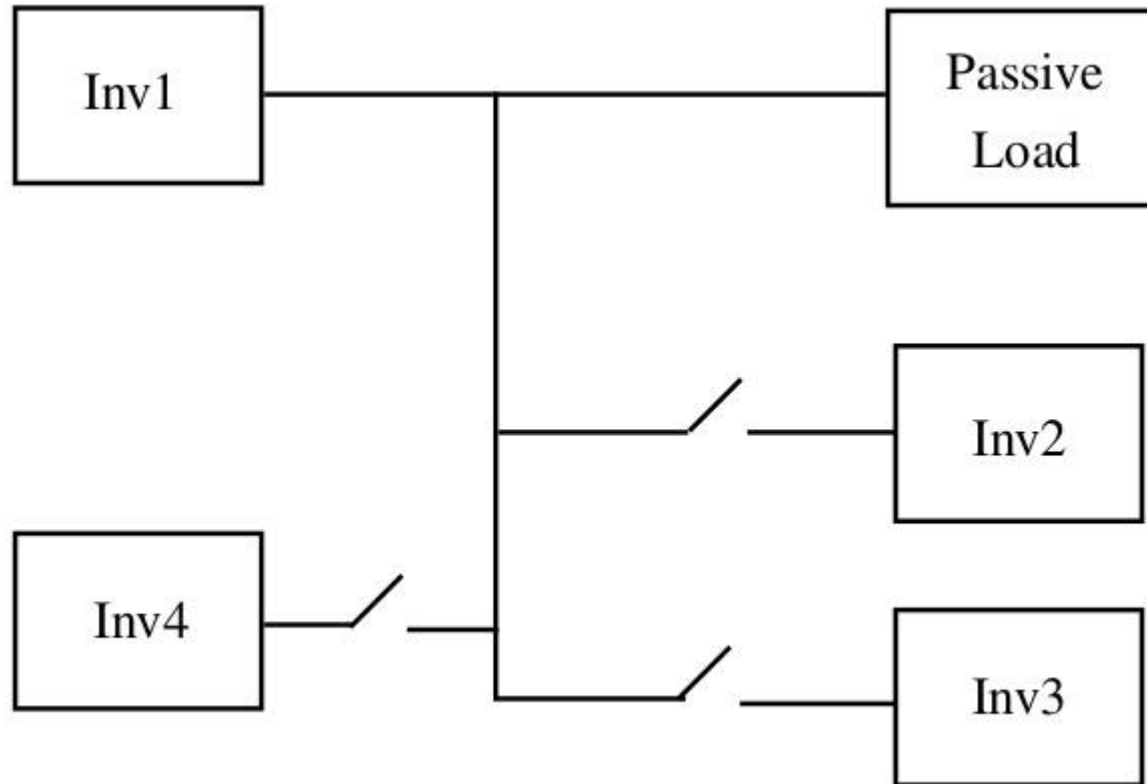
To controllable elements or to other control code or just to the output data file

To schedule the control code to mimic with precision microcontrollers or other digital controllers in actual hardware.

In progress

- 12 sample circuits simulated with reports at
 - <http://pythonpowerelectronics.com/blog.html>
- Short papers on the simulator available at
 - <http://pythonpowerelectronics.com/documentdownloads.html>
- 17 versions of the software available at
 - <http://pythonpowerelectronics.com/softwaredownloads.html>
- Book on circuit simulator which should be published by February 2017. Table of contents available at
 - <http://pythonpowerelectronics.com/documentdownloads.html>

Latest case



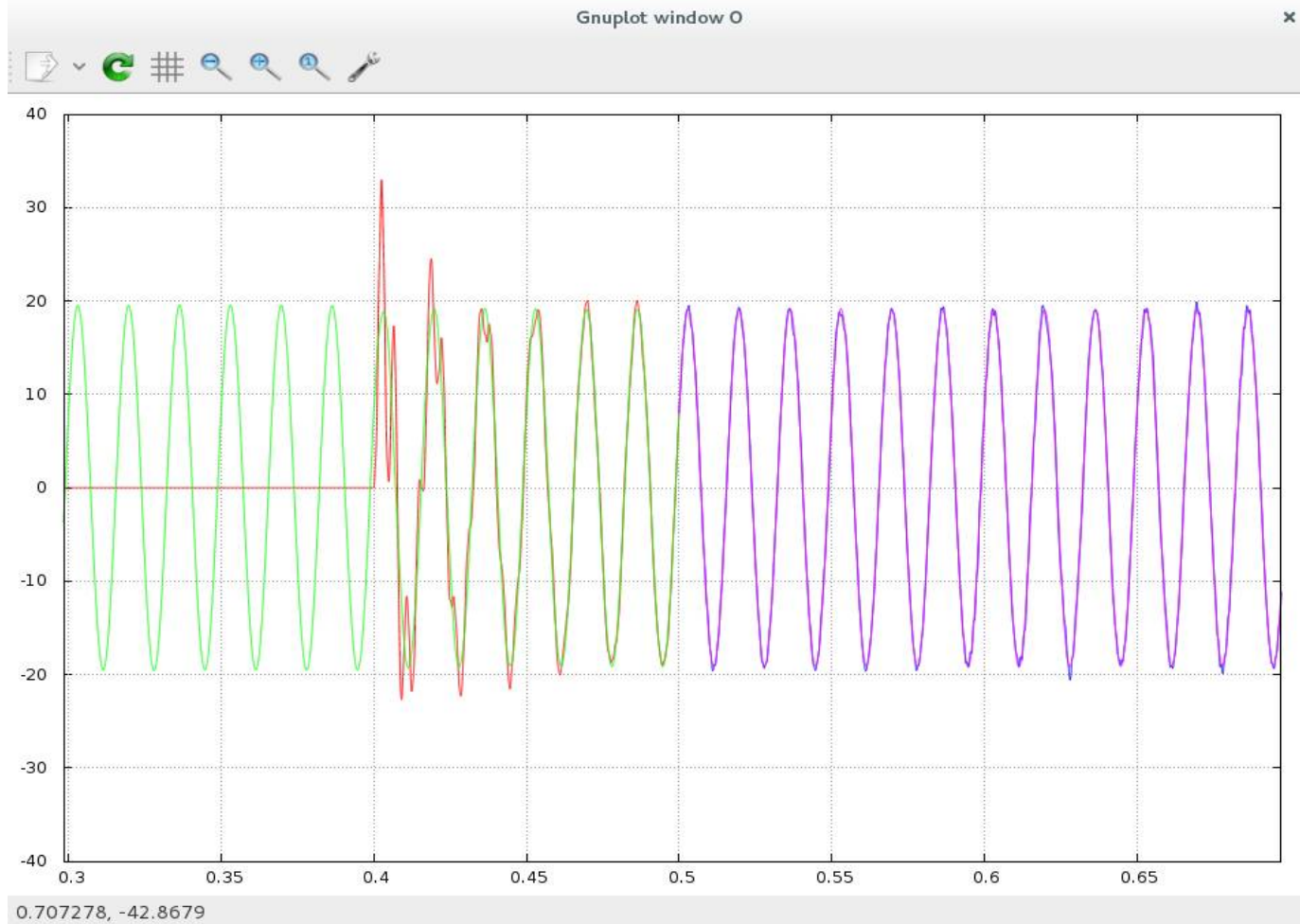
Multiple inverters forming a smart grid

<http://pythonpowerelectronics.com/posts/case12/blogpost.html>

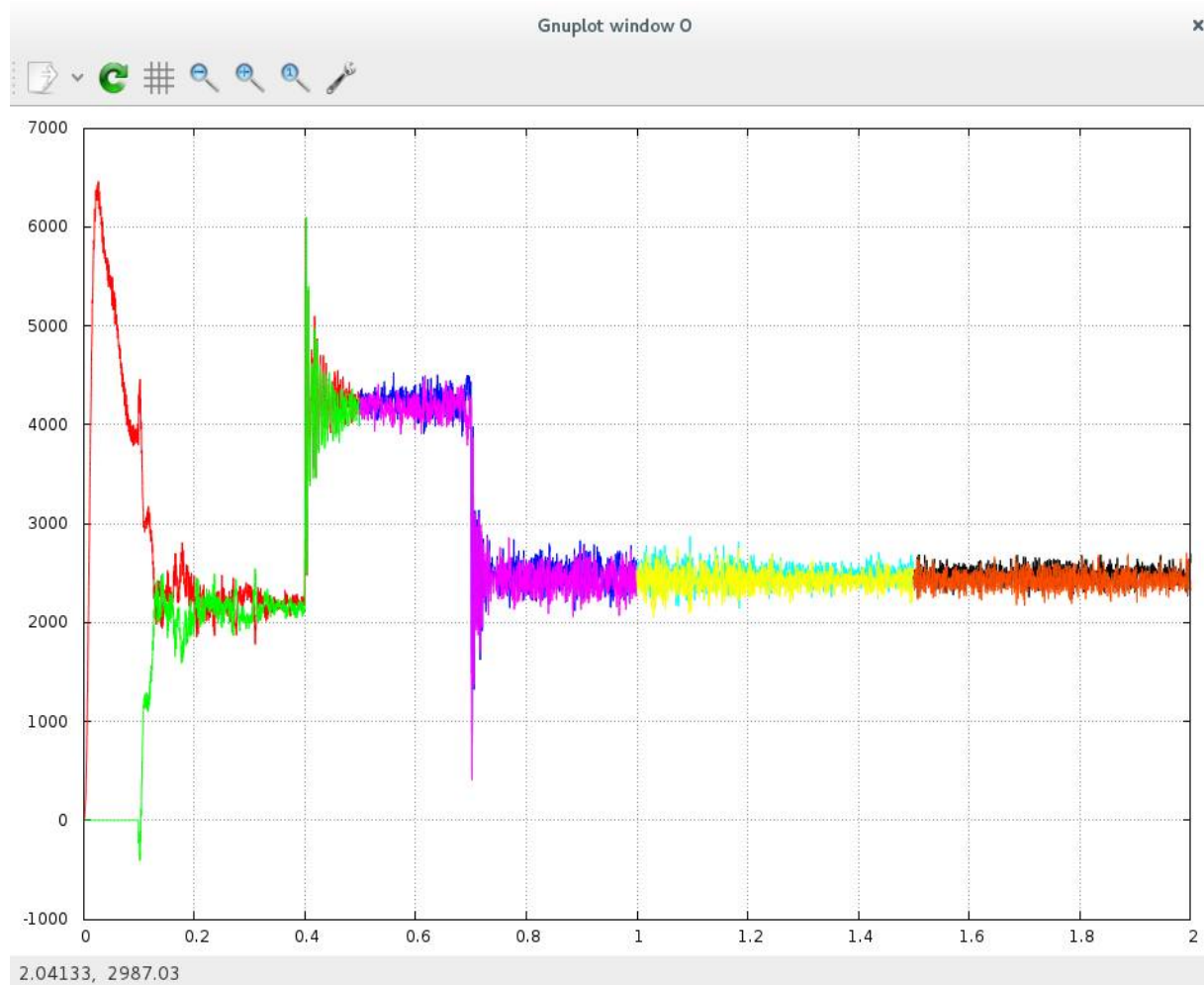
Latest case

- Every inverter has its own dedicated set of control code to ensure it generates the power needed.
- For a time window of 2 seconds, the simulation runs for 46 hours and generates 300 MB of data.
- Using this simulation, I could design the exact controller gains that would be needed to achieve power sharing.

Latest case results



Latest case results



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THANK YOU!