Control a motor with Python / FluidLab

http://fluidlab.readthedocs.org

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Tools for controlling experiments

Labview (proprietary software by National Instruments)

Pros

- very adapted to "National Instruments"
- pretty good documentation
- somehow easy, in particular for simple GUI
- graphical programming

Cons

- difficult for many researchers
- graphical programming
- not open-source
  - cost (on the long range)
  - close source (black box)
- very specialized language (analyses and plots have to be done with another tool)

Tools for controlling experiments

Another approach: clean open-source (project FluidLab)

Use tools and methods of modern programming:

- Python (high-level generalist dynamic language)
- object-oriented
- handle exceptions
- very easy installation
- distributed revision control tools (Mercurial and Bitbucket)
- semi-automatic documentation (`http://fluidlab.readthedocs.org`)
- unit tests
- GUI (ex: Qt framework, with qt-designer),

FluidLab is in building!

Still only alpha versions

Control a motor and its frequency drive

Modbus RTU with RS485 in RJ45!

`http://fluidlab.readthedocs.org/en/latest/examples/control_motor.html`

- communication chain (motor drive: RJ45 RS485 $\rightarrow$ RS232 $\rightarrow$ USB $\rightarrow$ computer)
- driver for the motor
- documentation
- interactively + scripts + GUI
- internal (code): quite complicated because the motor drive is complicated but as simple as possible

Many problems of communications

"Random" Modbus errors in mode servo in particular when the motor is running.

Why?

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Why?

Solutions

- Try to improve the communication chain (RJ45 RS485 $\rightarrow$ RS232 $\rightarrow$ USB): still many errors
- At the software level: child class to handle the errors... basically by re-sending the Modbus messages (see .py code): works well!
- Using a better RJ45 cable help a lot (much less error)!

Conclusions

Control a motor and its frequency drive

- RS485 via RJ45 very sensible to electromagnetic noise
- Modbus RTU not very reliable
- Need good RJ45 cables!
- The problems can be somehow overcome at the software level

Conclusions

FluidLab: an attempt for a modern, clean and open-source code for experiments

- can already do many things
- in building: will do many more!

Future: users, developers, community ?

We need a model for open-software in academics!

Still to be invented!