Getting Started with MMS in pySPEDAS

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Getting Started with pySPEDAS

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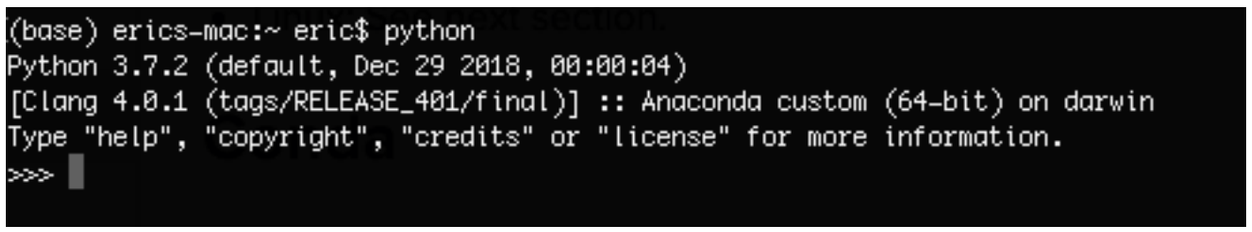
Installing Anaconda

Step-by-step instructions for installing Anaconda can be found at:

- macOS
    - https://docs.anaconda.com/anaconda/install/mac-os/
- Windows
    - https://docs.anaconda.com/anaconda/install/windows/
- Linux
    - https://docs.anaconda.com/anaconda/install/linux/

Installing Anaconda

- Once Anaconda is installed, you should be able to open Python in your terminal window by typing “python”.
- note: your Python version will be the first line displayed



Creating a virtual environment

- To avoid potential dependency issues with other Python packages, it's best to create a virtual environment in Python

- You can create a virtual environment in your terminal with:

    - python -m venv environment-name

- And enter into that virtual environment by running the 'activate' script with:

    - source environment-name/bin/activate (macOS and Linux)

    - .\environment-name\Scripts\activate (Windows)

- e.g.,

```
(base) erics-mac:~ eric$ python -m venv pyspedas-stuff
(base) erics-mac:~ eric$ source pyspedas-stuff/bin/activate
(pyspedas-stuff) (base) erics-mac:~ eric$ python
Python 3.7.2 (default, Dec 29 2018, 00:00:04)
[Clang 4.0.1 (tags/RELEASE_401/final)] :: Anaconda custom (64-bit) on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>>
```

Installing pySPEDAS

- The first time you enter your virtual environment, you'll have to install pyspedas; this is as simple as:
    - pip install pyspedas
- This should go out and find all of the required libraries and install them inside the virtual environment.
- If you would like to upgrade your copy of your pySPEDAS libraries inside of your virtual environment, use:
    - pip install pyspedas --upgrade

Setting your local data directory

- The recommended way of setting your local data directory is to set the SPEDAS_DATA_DIR environment variable. SPEDAS_DATA_DIR acts as a root data directory for all missions, and will also be used by IDL (if you're running a recent copy of the bleeding edge).

- Mission specific data directories (e.g., MMS_DATA_DIR) can also be set, and these will override SPEDAS_DATA_DIR

- If you've already set the MMS_DATA_DIR environment variable for IDL, your local data directory should already be set

Setting your local data directory

- On macOS, I set my SPEDAS_DATA_DIR environment variable in my .bash_profile file located at:
  - /Users/eric/.bash_profile
- By adding the command (to the bottom):
  - export SPEDAS_DATA_DIR=/Volumes/data/data

Setting your network mirror data directory

- If you have a mirror of the MMS dataset on your local network, you may want to set the MMS_MIRROR_DATA_DIR environment variable

- If set, when you use the **no_update** keyword in the load routines (or if don't have an internet connection), the load routines will check the mirror for data

- Just as in IDL, data files found on the network mirror will be copied to your local data directory before loading them

Checking that everything is working

- The quickest way to check if everything is working is to load some data; once you're inside Python in your virtual environment, try:
    - import pyspedas
    - pyspedas.mms.fgm()
- This should load some default data (srvy mode, probe 1) for Oct 16, 2015
- You can then plot the FGM data with:
    - from pytplot import tplot
    - tplot('mms1_fgm_b_gse_srvy_l2')

Where to find MMS examples

- You can find several Jupyter notebooks with MMS examples on GitHub at:
  - https://github.com/spedas/mms-examples

- Clicking the figures on that page should take you to a notebook that shows how to create the figure you clicked on