Data Processing School :: Exercise PSR 03

Source directory	/data/lofarschool/data/Exercise-PSR-03
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Context

Illustrates an important technique for characterizing RFI, finding binary pulsars, as well as other science like planets and flare stars.

Prerequisite

Exercises PSR-01 and PSR-02 and knowledge of what a dynamic spectrum shows.

Description

In this exercise, the user will create a dynamic spectrum from timeseries data and interactively inspect it for a pulsar signal and RFI. This is one way in which binary pulsars (who’s signal is Doppler shifted) can be detected, but it also gives a way to characterise other pseudo-periodic interfering sources. Also important technique for other science like planets and flare stars.

Files & Directories

DATA:

B0809+74_081220_4tiles_DM6.12.dat: LOFAR timeseries (all observed subbands dedispersed and added)

B0809+74_081220_4tiles_DM6.12.fft: a power spectrum of the timeseries

B0809+74_081220_4tiles_DM6.12.inf: required header info

Ter5_03Oct04_DM238.00_350s.pick: a dynamic spectrum of data from the globular cluster Ter5. There are at least a dozen pulsars to see in these data (look at the dynamicfftsearch.py for a list of their spin frequencies).

Ter5_03Oct04_DM238.00_350s.inf: required header info

SCRIPT:

dynamicfftsearch.py: the python script that creates a dynamic spectrum. Feel free to tweak this if you know some python.

SAMPLE OUTPUT:

dsp_346.00.ps: a dynamic spectrum showing the binary motion of the 2-hr eclipsing pulsar Ter5A.

OTHER:

COMMANDS.txt: some sample commands that the user can run

PULSAR_ENV: necessary environment variables (bash shell assumed)

Step-by-step instructions

1. To create a dynamic spectrum with a given central frequency and sub-int length:

```
python dynamicfftsearch.py 3.0 310 0 B0809+74_081220_4tiles_DM6.12.dat
```

2. To move left or right in this dyn. spectrum: type “,” or “.”
3. To print the current window: type “p”
4. To view the eclipsing 2-hr binary pulsar Ter5A (data from GBT):

```
python dynamicfftsearch.py 86.5 350 1 Ter5_03Oct04_DM238.00_350s.pick
```

Example outputs