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Reducing Spigot Data - Useful Commands

A poscript version is available here

pyhead spigot_info spigot_bandpass spigot_laghist spigot_rawlaghist spigot_lag spigot_rawlag spigot_acf spigot_rawacf plot_calib modify_calib exploredat readfile prepdata prepfold

You must source either ~pulsar/scripts/spigot.csh or ~pulsar/scripts/spigot.sh for tcsh/bash before running these commands

- **pyhead.py**: Used to print/modify headers

  Usage: *pyhead.py [-p/d/u/a keyword/expression] filename(s)*

  Example: *pyhead.py -u RA 1.520000 -u DEC 18.583056 -u OBJECT J0006+1834 spigot_52983_0017_0001.fits*

  Arguments:

  - -u : update
  - -p : print
  - -d : delete
  - -a : add
  - -f *filename* : read a list of the commands you wish to execute in a file instead of typing them on the command line.

  Useful header keywords:

  - OBJECT: *pulsar_name*
  - RA: *R.A. in decimal degrees*
  - DEC: *Dec. in decimal degrees*
  - CENTFREQ: *Center frequency in MHz*
  - UPPERSB: *pyfits.TRUE* or *pyfits.FALSE*

- **spigot_info.py**: Displays vital info about spigot files

  Usage: *spigot_info.py infile [infile2 infile3 ...]*

  Arguments: none

- **spigot_bandpass.py**: Plots bandpass for samples 0..max_sample from the files provided

  Usage: *spigot_bandpass.py [options] infile [infile2 infile3 ...]*

  Arguments:

  - -s max_sample (defaults to all samples)
  - -o : if specified, output data to STDOUT

- **spigot_laghist.py**: Plots histogram for a lag for specified files

  Usage: *spigot_laghist.py [options] infile [infile2 infile3 ...]*

  Arguments:

  - -b bins (defaults to 100)
  - -l lag (defaults to 0)

- **spigot_rawlaghist.py**: Plots histogram for an unscaled lag for specified files

  Usage: *spigot_rawlaghist.py [options] infile [infile2 infile3 ...]*

  Arguments:

  - -b bins (defaults to 100)
  - -l lag (defaults to 0)

- **spigot_lag.py**: Plots value of a lag for sample=0..max_sample

  Usage: *spigot_lag.py [options] infile [infile2 infile3 ...]*

  Arguments:

  - -s max_sample (defaults to all samples)
  - -l lag (defaults to 0)

- **spigot_rawlag.py**: Plots value of an unscaled lag for sample=0..max_sample

  Usage: *spigot_rawlag.py [options] infile [infile2 infile3 ...]*

  Arguments:

  - -s max_sample (defaults to all samples)
  - -l lag (defaults to 0)

- **spigot_acf.py**: Plots acf up to max_lagfor samples 0..max_sample from the files provided

  Usage: *spigot_acf.py [options] infile [infile2 infile3 ...]*

  Arguments:

  - -s max_sample (defaults to all samples)
  - -l max_lag (defaults to all lags)
  - -o : if specified, output data to STDOUT

- **spigot_rawacf.py**: Plots raw acf up to max_lagfor samples 0..max_sample from the files provided

  Usage: *spigot_rawacf.py [options] infile [infile2 infile3 ...]*

  Arguments:

  - -s max_sample (defaults to all samples)
  - -l max_lag (defaults to all lags)
  - -o : if specified, output data to STDOUT

- **plot_calib.py**: Plots the scale and offset from the specified calibration file as a function of lag

  Usage: plot_calib.py [-d] [-x x1:x2] calib.fits [calib2.fits ...]

  Arguments:

  - -d - pgplot device (default is /Xwin)
  - -x x1:x2 - Range of lags to plot (default is all)

- **modify_calib.py**:Modifies the calibration in input.fits and writes to output.fits

  Usage: *modify_calib.py [-g -b] [-1] [-2] -i* *-o*

  Arguments:

  - -d x1:x2 - Good range of lags (do not overwrite). Default is none
  - -b z1:z2 - Bad range of lags (do overwrite). Default is all
  - -1 scaleFactorA - Amount to multiply scaleFactorA by (default is 1)
  - -2 scaleFactorB - Amount to multiply scaleFactorB by (default is 1)

- **exploredat**: Interactive data explorer

  Usage: *exploredat datafilename*

  Example: *exploredat spigot_52000_0031_0009.dat*

  Arguments: *none*

- **readfile**: PRESTO program which reads raw data from a binary (fits) file and displays it on the screen
  PRESTO programs expect Boolean variables (e.g. UPPERSB) to be equal to 'T' or 'F'
  NOTE: PRESTO programs should only be used for "quick looks" at data. If you wish to use the PRESTO programs to reduce your data for publication, please contact Scott Ransom for permission.

  Example: *readfile spigot_52873_22_1.fits*

  Arguments:

  - -nopage: Don't paginate the output like 'more'
  - -byte: Raw data in byte format
  - -b: Raw data in byte format
  - -float: Raw data in floating point format
  - -f: Raw data in floating point format
  - -double: Raw data in double precision format
  - -d: Raw data in double precision format
  - -fcomplex: Raw data in float-complex format
  - -fc: Raw data in float-complex format
  - -dcomplex: Raw data in double-complex format
  - -dc: Raw data in double-complex format
  - -short: Raw data in short format
  - -s: Raw data in short format
  - -int: Raw data in integer format
  - -i: Raw data in integer format
  - -long: Raw data in long format
  - -l: Raw data in long format
  - -rzwcand: Raw data in rzw search candidate format
  - -rzw: Raw data in rzw search candidate format
  - -bincand: Raw data in bin search candidate format
  - -bin: Raw data in bin search candidate format
  - -position: Raw data in position struct format
  - -pos: Raw data in position struct format
  - -pkmb: Raw data in Parkes Multibeam format
  - -bcpm: Raw data in BCPM format
  - -wapp: Raw data in WAPP format
  - -spigot: Raw data in Spigot Card format
  - -fortran: Raw data was written by a fortran program
  - -index: The range of objects to display
    0...2 int values between -1 and oo
    default: '0' ' -1'
  - -nph: 0th FFT bin amplitude (for 'RZW' data)
    1 double value
  - file: Input data file name. 1 value

- **prepdata**: PRESTO data-preparation/de-dispersal

  PRESTO programs expect Boolean variables (e.g. UPPERSB) to be equal to 'T' or 'F'
  NOTE: PRESTO programs should only be used for "quick looks" at data. If you wish to use the PRESTO programs to reduce your data for publication, please contact Scott Ransom for permission.

  Usage: *prepdata [options] infile*

  Example: *prepdata -dm 9.0233 -spigot -shorts -o test spigot_52873_22_1.fits*

  Arguments:

  - -o: Root of the output file names
  - -pkmb: Raw data in Parkes Multibeam format
  - -gmrt: Raw data in GMRT Phased Array format
  - -bcpm: Raw data in Berkeley-Caltech Pulsar Machine (BPP) format
  - -spigot: Raw data in Caltech-NRAO Spigot Card format
  - -wapp: Raw data in Wideband Arecibo Pulsar Processor (WAPP) format
  - -window: Window correlator lags with a Hamming window before FFTing
  - -numwapps: Number of independent boards used with contiguous frequencies
    1 int value between 1 and 7
    default: '1'
  - -if: A specific IF to use if available (summed IFs is the default)
    1 int value between 0 and 1
  - -clip: Time-domain sigma to use for clipping (0.0 = no clipping, 6.0 = default
    1 float value between 0 and 20.0
    default: '6.0'
  - -noclip: Do not clip the data. (The default is to _always_ clip!)
  - -numout: Output this many values. If there are not enough values in the original data file, will pad the output file with the average value
    1 int value between 1 and oo
  - -downsamp: The number of neighboring bins to co-add
    1 int value between 1 and 32
    default: '1'
  - -nobary: Do not barycenter the data
  - -shorts: Use short ints for the output data instead of floats
  - -DE405: Use the DE405 ephemeris for barycentering instead of DE200 (the default)
  - -dm: The dispersion measure to de-disperse (cm^-3 pc)
    1 double value between 0 and oo
    default: '0'
  - -mask: File containing masking information to use
    1 char* value
  - infile: Input data file name. If the data is not in PKMB or EBPP format, it should be a single channel of single-precision floating point data. In this case a '.inf' file with the same root filename must also exist (Note that this means that the input data file must have a suffix that starts with a period)

- **prepfold**: Prepares (if required) and folds raw radio data, standard time series, or events.
  PRESTO programs expect Boolean variables (e.g. UPPERSB) to be equal to 'T' or 'F'
  NOTE: PRESTO programs should only be used for "quick looks" at data. If you wish to use the PRESTO programs to reduce your data for publication, please contact Scott Ransom for permission.

  Example: *prepfold -par 1012+53.par test.sdat*

  Arguments:

  - -o: Root of the output file names
  - -pkmb: Raw data in Parkes Multibeam format
  - -gmrt: Raw data in GMRT Phased Array format
  - -bcpm: Raw data in Berkeley-Caltech Pulsar Machine (BPP) format
  - -spigot: Raw data in Caltech-NRAO Spigot Card format
  - -wapp: Raw data in Wideband Arecibo Pulsar Processor (WAPP) format
  - -window: Window correlator lags with a Hamming window before FFTing
  - numwapps: Number of WAPPs used with contiguous frequencies 1 int value between 1 and 7 default: '1'
  - -if: A specific IF to use if available (summed IFs is the default) 1 int value between 0 and 1
  - -clip: Time-domain sigma to use for clipping (0.0 = no clipping, 6.0 = default 1 float value between 0 and 20.0
    default: '6.0'
  - -noclip: Do not clip the data. (The default is to _always_ clip!)
  - -DE405: Use the DE405 ephemeris for barycentering instead of DE200 (the default)
  - -noxwin: Do not show the result plots on-screen, only make postscript files
  - -runavg: Subtract each blocks average as it is read (single channel data only)
  - -fine: A finer gridding in the p/pdot plane (for well known p and pdot)
  - -coarse: A coarser gridding in the p/pdot plane (for uknown p and pdot)
  - -slow: Sets useful flags for slow pulsars
  - -searchpdd: Search p-dotdots as well as p and p-dots
  - -searchfdd: Search f-dotdots as well as f and f-dots
  - -nosearch: Show but do not search the p/pdot and/or DM phase spaces
  - -nopsearch: Show but do not search over period
  - -nopdsearch: Show but do not search over p-dot
  - -nodmsearch: Show but do not search over DM
  - -scaleparts: Scale the part profiles independently
  - -allgrey: Make all the images greyscale instead of color
  - -justprofs: Only output the profile portions of the plot
  - -dm: The central DM of the search (cm^-3 pc)
    1 double value between 0 and oo
    default: '0'
  - -n: The number of bins in the profile. Defaults to the number of sampling bins which correspond to one folded period
    1 int value
  - -nsub: The number of sub-bands to use for the DM search
    1 int value between 1 and 512
    default: '32'
  - -npart: The number of sub-integrations to use for the period search
    1 int value between 1 and 512
    default: '64'
  - -pstep: The minimum period stepsize over the observation in profile bins
    1 int value between 1 and 10
    default: '2'
  - -pdstep: The minimum P-dot stepsize over the observation in profile bins
    1 int value between 1 and 20
    default: '4'
  - -dmstep: The minimum DM stepsize over the observation in profile bins
    1 int value between 1 and 10
    default: '2'
  - -npfact: 2 * npfact * proflen + 1 periods and p-dots will be searched
    1 int value between 1 and 10
    default: '2'
  - -ndmfact: 2 * ndmfact * proflen + 1 DMs will be searched
    1 int value between 1 and 1000
    default: '3'
  - -p: The nominative folding period (s)
    1 double value between 0 and oo
  - -pd: The nominative period derivative (s/s)
    1 double value
    default: '0.0'
  - -pdd: The nominative period 2nd derivative (s/s^2)
    1 double value
    default: '0.0'
  - -f: The nominative folding frequency (hz)
    1 double value between 0 and oo
  - -fd: The nominative frequency derivative (hz/s)
    1 double value
    default: '0'
  - -fdd: The nominative frequency 2nd derivative (hz/s^2)
    1 double value
    default: '0'

- -pfact: A factor to multiple the candidate p and p-dot by
  1 double value between 0.0 and 100.0
  1 double value between 0.0 and 100.0
  default: ‘1.0’
- -ffact: A factor to multiple the candidate f and f-dot by
  1 double value between 0.0 and 100.0
  default: ‘1.0’
- -phs: Offset phase for the profil
  1 double value between 0.0 and 1.0
  default: ‘0.0’
- -start: The folding start time as a fraction of the full obs
  1 double value between 0.0 and 1.0
  default: ‘0.0’
- -end: The folding end time as a fraction of the full obs
  1 double value between 0.0 and 1.0
  default: ‘1.0’
- -psr: Name of pulsar to fold (do not include J or B)
  1 char* value
- -par: Name of a TEMPO par file from which to get PSR params
  The tempo .par files live in /home/users/pulsar/tempo/tzpar
  1 char* value
- -polycos: File containing TEMPO polycos for psrname (not required)
  1 char* value
- -timing: Sets useful flags for TOA generation. Generates polycos (if required) based on the par file specified as the argument. (This means you don’t need the -par or -psr commands!)
- -rzwcand: The candidate number to fold from ’infile’_rzw.cand
  1 int value between 1 and oo
- -rzwfile: Name of the rzw search ’.cand’ file to use (with suffix)
- -accelcand: The candidate number to fold from ’infile’_rzw.cand
  1 int value between 1 and oo
- -accelfile: Name of the accel search ’.cand’ file to use (with suffix)
- -bin: Fold a binary pulsar. Must include all of the following parameters
- -pb: The orbital period (s)
  1 double value between 0 and oo
- -x: The projected orbital semi-major axis (lt-sec)
  1 double value between 0 and oo
- -e: The orbital eccentricity
  1 double value between 0 and 0.9999999
  default: ‘0’
- -To: The time of periastron passage (MJD)
  1 double value between 0 and oo
- -w: Longitude of periastron (deg)
  1 double value between 0 and 360
- -wdot: Rate of advance of periastron (deg/yr)
  1 double value
  default: ‘0’
- -mask: File containing masking information to use
- -events: Use a event file instead of a time series (.dat) file
- -days: Events are in days since the EPOCH in the ’.inf’ file (default is seconds)
- -mjds: Events are in MJDs
- -double: Events are in binary double precision (default is ASCII)
- -offset: A time offset to add to the 1st event in the same units as the events
  1 double value
  default: ‘0’
- infile: Input data file name. If the data is not in a regognized raw data format, it should be a file containing a time series of single-precision floats or short ints. In this case a ’.inf’ file with the same root filename must also exist (Note that this means that the input data file must have a suffix that starts with a period)