
ligoDV: A matlab GUI for quick analysis and plotting of Ligo data

Joshua Smith
Syracuse University

ligoDV History

- For time immemorial the GEO600 team used a mixture of home-brewed Matlab scripts to retrieve data, do analyses, make plots
- Ca. 2003 **Martin Hewitson** creates dv1, a simple GUI for retrieving data, doing simple analyses
- Development continues at GEO600 and in 2007 Martin makes a Ligo port of dv6, called ligoDV and hands it off to the LSC
- In late 2007 development of ligoDV begins in LSC (J.Smith)

Data retrieval mode

NDS Server mode

Server info

raw data data type

xxxxxx.ligo-wa.caltech... server menu

xxxx.ligo-wa.caltech.edu server

0000 port

9 rds level

1 cal version

mean statistic

Query server

Time settings

UTC time mode

2008-02-04 19:31:52 886188726 Get current

UTC input

2008-02-04 19:31:51 start Set current - 1s

2008-02-04 19:31:52 stop Set current

00:00:01 duration

comment

Time source

Single Time Edit times

Time List 0 # times

Channel list

Get channel list with fs<256

- H0:PEM-EX_SEISX (256)
- H0:PEM-EX_SEISY (256)
- H0:PEM-EX_SEISZ (256)
- H0:PEM-EY_SEISX (256)
- H0:PEM-EY_SEISY (256)
- H0:PEM-EY_SEISZ (256)
- H0:PEM-LVEA_SEISX (256)
- H0:PEM-LVEA_SEISY (256)
- H0:PEM-LVEA_SEISZ (256)
- H0:PEM-MX_SEISX (256)
- H0:PEM-MX_SEISY (256)
- H0:PEM-MX_SEISZ (256)
- H0:PEM-MY_SEISX (256)
- H0:PEM-MY_SEISY (256)
- H0:PEM-MY_SEISZ (256)
- H0:PEM-VAULT_SEISX (256)
- H0:PEM-VAULT_SEISY (256)
- H0:PEM-VAULT_SEISZ (256)

seis search

Pre processing

1/1 resample

whiten data

math f(u)

u

heterodyne

100 Heterodyne f0

Data pool

Get data include prime data 3 # objs

01: 00:00:04	886188722	H0:PEM-EX_SEISX	256
02: 00:00:04	886188722	H0:PEM-EX_SEISY	256
03: 00:00:04	886188722	H0:PEM-EX_SEISZ	256

set filters

clear filters

apply filters

on off

launch sptool

search

combine math f(u,v)

u+v

combine objects

clear all save objects export objects

delete load objects duplicate objects

01: H0:PEM-EX_SEISX

Time info

start: 2008-02-04 19:31:48 [886188722]

stop: 2008-02-04 19:31:52 [886188726]

duration: 00:00:04

comment:

Data info: raw data @ 256Hz [1024 samples]

Units: Time (sec) / V

Source

server: ligo-wa.caltech.edu:

Pre-processing

heterodyne: 0 (@ 100.00 Hz)

whitened: 0

resample factor: 1

math: u

Post-processing

prime data = 3

0 filters

apply filters = 0

edit filters

Analysis/Plotting

0:end data select (s)

Time-series analysis

Time-series

stacked plot config

u math f(u)

u examples

noise-floor estimate

16 bw [Hz]

0.8 outlier [0-1]

mark freqs

edit freqs

#freqs=0

correct filters

save products

export products

x limits

y limits

plot

* getting data 100.0%

ligoDV Release 1.7

contact: jrsmit02@phy.syr.edu

ligoDV features

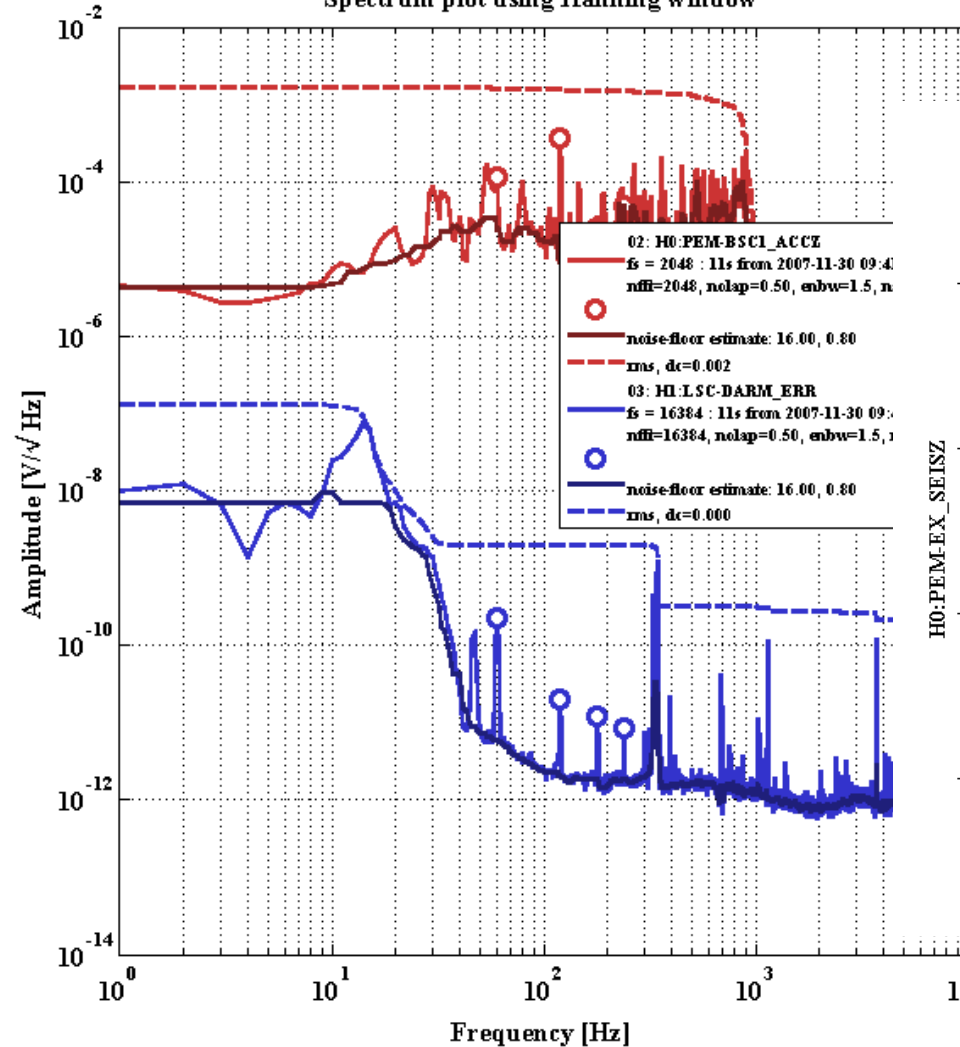
- Downloads channel list from server
- Downloads requested channel data (**raw or trends**) for given time segment or list
- Basic filtering, math, down-sampling available
- Allows plotting of time series, spectrum, spectrogram, transfer function, coherence, histogram, cross-correlation, XY-scatter
- Data can be saved or exported to workspace at several points
- Other features grown from ~20 person years of GEO commissioning

Availability status

- Control room installs at LHO (linux and solaris) and LLO (linux only), thanks Lisa and Dave!
- Uses NDS to get data from site frame-builders
 - » Not optimal: only recent raw data, frame-builders can't serve many users
 - » Plan to improve NDS, install elsewhere, e.g. Caltech
 - » **Stopgap measure proposed to improve current NDS**
- Relatively system independent (practically limited by NDS client to Mac and Linux)
- Download from:
 - » <https://www.gravity.phy.syr.edu/dokuwiki/doku.php?id=ligodv:home>
 - » But currently use restricted due to above NDS issues

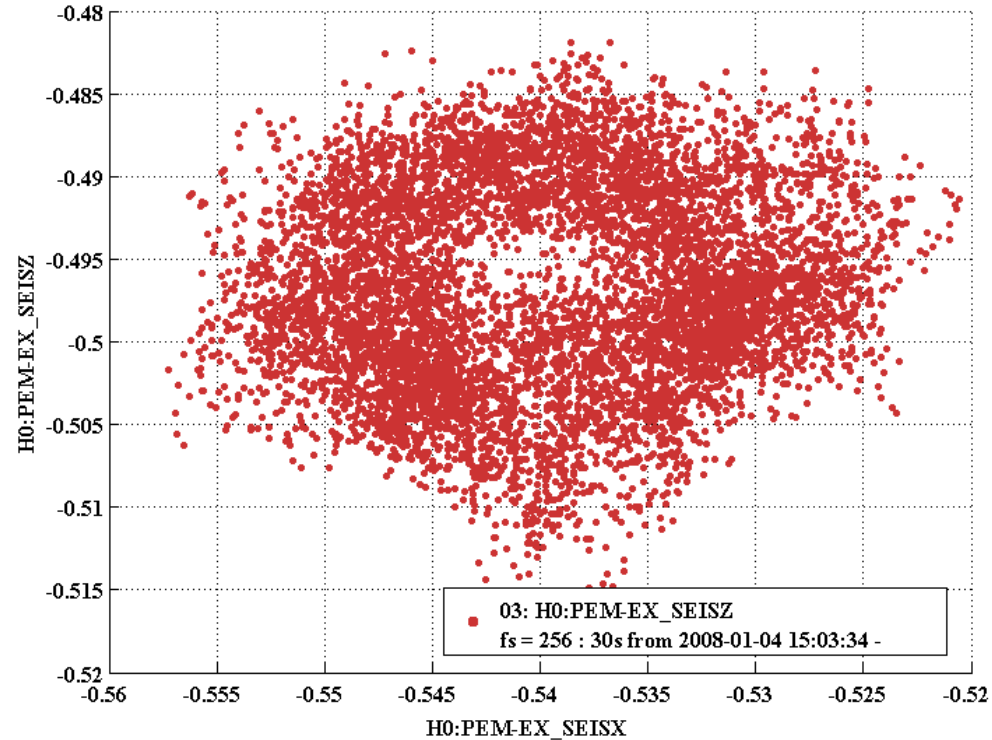
Sample plots

Spectrum plot using Hanning window



XY-scatter plot:

Primary = 01: H0:PEM-EX_SEISX
 fs = 256 : 30s from 2008-01-04 15:03:34 -



Demonstration

The End