



Tools for Burst Searches

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14 Mar 2001



How to identify fleeting imposters?

- Linear transfer functions, correlation, coherence from non-strain to strain channels
- Power relationships from non-strain to strain channels (Time-Frequency, or simply time)
- Multiple-channel equivalents of the above (e.g., bi-linear processes)
- Recognition of short-term non-stationarity
 - » Or 'non-stationery' as the spell-checker suggested
- Exploration, and then Production tools

- Certainty/Expectation/Hope: much of wish list may exist already, or be almost ready



Tools we'd love to have

- A tool to filter one, or a set, of data channels
- A library of filters, or filter elements (e.g., wavelets), which can identify burst-like events
- Visual exploratory tools to recognize short-term non-stationary behavior
 - » Time series
 - » Amplitude histograms, other statistical measures (ALLEGRO example)
 - » Spectral analysis
- Desirable features
 - » storing average or 'typical' displays;
 - » taking differences between real-time and reference signals;
 - » variation of parameters (time window, frequency range)
 - » Multiple traces/channels
 - » On-line construction of threshold logic for identifying significant events, collecting a menagerie of suspects
 - » Generation of new continuous variables which are measures of 'burst performance' for machine optimization



Real time or not to real time?

- Real-time tools feel like the right mode for exploration
- Past, and Present, interferometer diagnostics revolve around this approach – the Oscilloscope and Hpbox mentality
- GDS tools are the paradigm
- Would have enormous value to the commissioning/debugging process for the observatories (Value Added)

- What are the particular difficulties in developing real-time tools?



Questions to help understand where we stand

- Do we have a suitable virtual oscilloscope in either Dataviewer or DTT, or do we need something improved or special?
 - » e.g. aliasing problem in Dataviewer; multiple traces in same graphing box; freezing/zooming/trigging
- Do we have the ideal virtual spectrum analyzer (passive and stimulus-response) in DTT, or do we need something added or special?
- Do we have a good virtual "logic analyzer" that can trigger displays of many channels based on conditions being satisfied in some channels?
- What is the most convenient way to search across many channels for a coincidence with an event in a specified channel?
- Is there an automated way to construct statistics (e.g. histograms of filter outputs) for many channels at the same time?



Related structural questions

- What is the role of DMT through the analysis process?
- What is the relationship of the asked-for tools to LDAS?
- How best to maintain continuity from GDS-like tools to production and through to post-processing tools?