# Data conditioning for first analyses

Lee Samuel Finn

Penn State

LIGO-G010146-00-Z


# Goals

- Identify needs
- Identify resources
- Coordinate activities


# Agenda

- Review
  - » Current functionality
  - » Planned functionality
- Needs
  - » Bursts
  - » Inspiral
  - » Periodic
  - » Stochastic
- Required resources & coordination


# Current functionality

- Conditioning
  - » (I)DFT
    - – Forward, reverse DFT
  - » Linear filtering
  - » Decimation
  - » Heterodyning
    - – Digital lock-in
- Characterization
  - » Descriptive statistics
    - – Max, min, mean, variance, skew, kurtosis of sequence
  - » Power spectrum estimation
  - » X-spectral density, coherence


# Planned functionality

- Conditioning
  - » Auto, cross-correlations
  - » Line removal
    - – Power-mains
    - – Violin modes
  - » Broad-band regression
    - – Time domain
    - – Frequency domain
- Characterization
  - » System ID (AR/ARX)
  - » Bispectrum/bicoherence
  - » Stationarity tests
    - – Broad, narrow band
  - » Histogram accumulation
  - » Parametric PSD estimation


# Needs

- Data conditioning actions
  - » Drop-out fill-in?
- Data volume
  - » Number channels, duration, sample rates
  - » Number simultaneous pipeline (per search)
- Precision
  - – E.g., of power spectral density estimate

# Resources & Coordination

- datacondAPI highly integrated into LDAS
  - » Disconnected development won't work
- datacondAPI Team
  - » Not in UL group or UL group unknown: Charlton, Ehrens, Maros, Ottewill, Searle
- Burst
  - » W. Anderson, Blackburn, *Finn*, Katsavounidis, Klimenko
- Inspiral
- Periodic
- Stochastic
  - » *Finn,* Landry, *Lazzarini, Romano*


# Actions

- Identify needs
  - » Data conditioning actions
    - – Regressions, correlations, power spectrum estimations, etc.
  - » Data volumes
    - – Number channels, duration, sample rates
  - » Precision estimation
- Identify resources
  - » Who, from the different groups, will contribute to the development effort?
- Need this information ASAP
  - » First cut: 1 April
  - » Final iteration:1 May