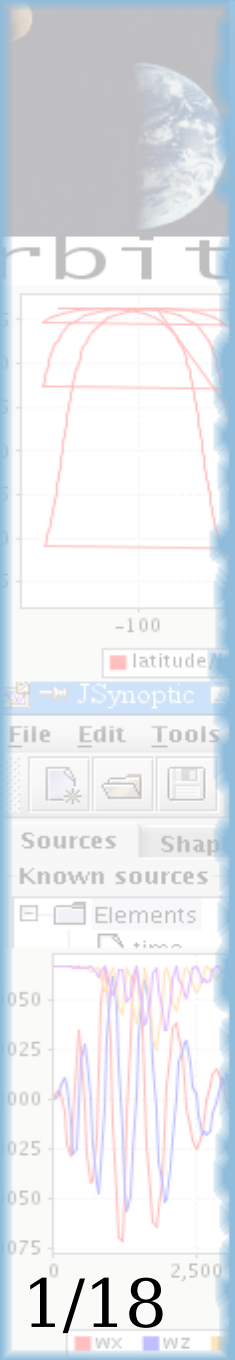
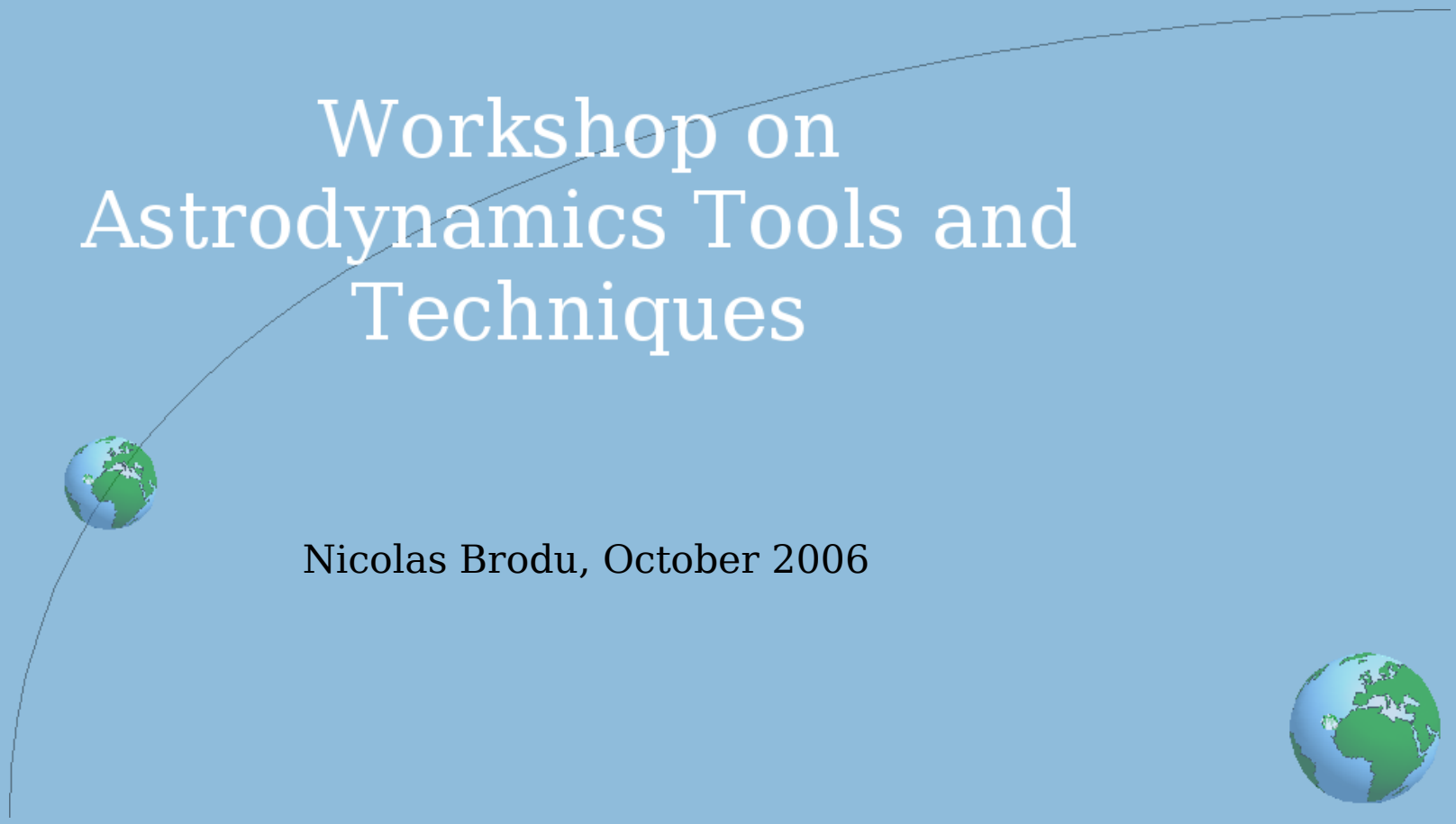
JSynoptic

Workshop on Astrodynamics Tools and Techniques

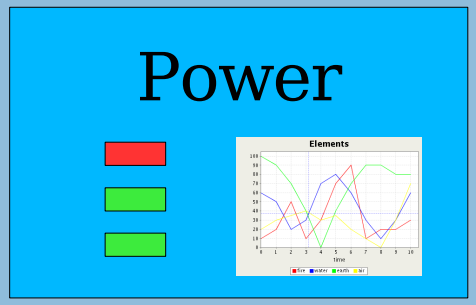


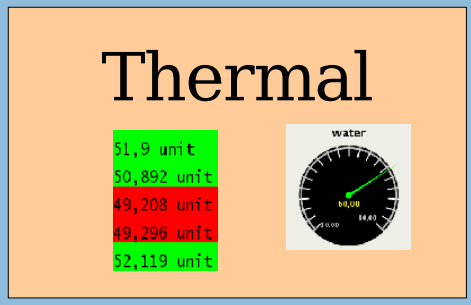


Nicolas Brodu, October 2006

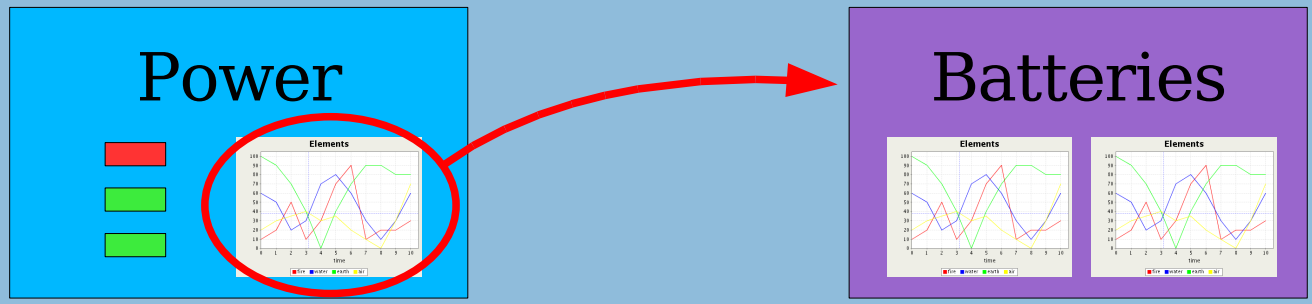
JSynoptic – A monitoring tool

- Prepare activity domain views on a system.



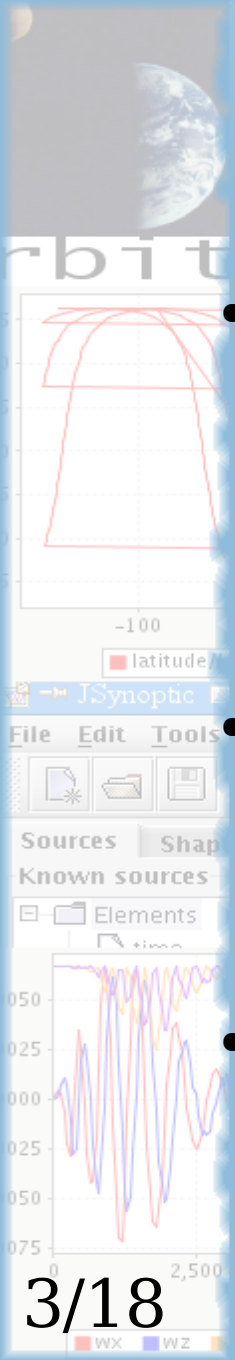


- Setup alarms and sub-systems.



- Connect to the live system.

JSynoptic – An analysis tool



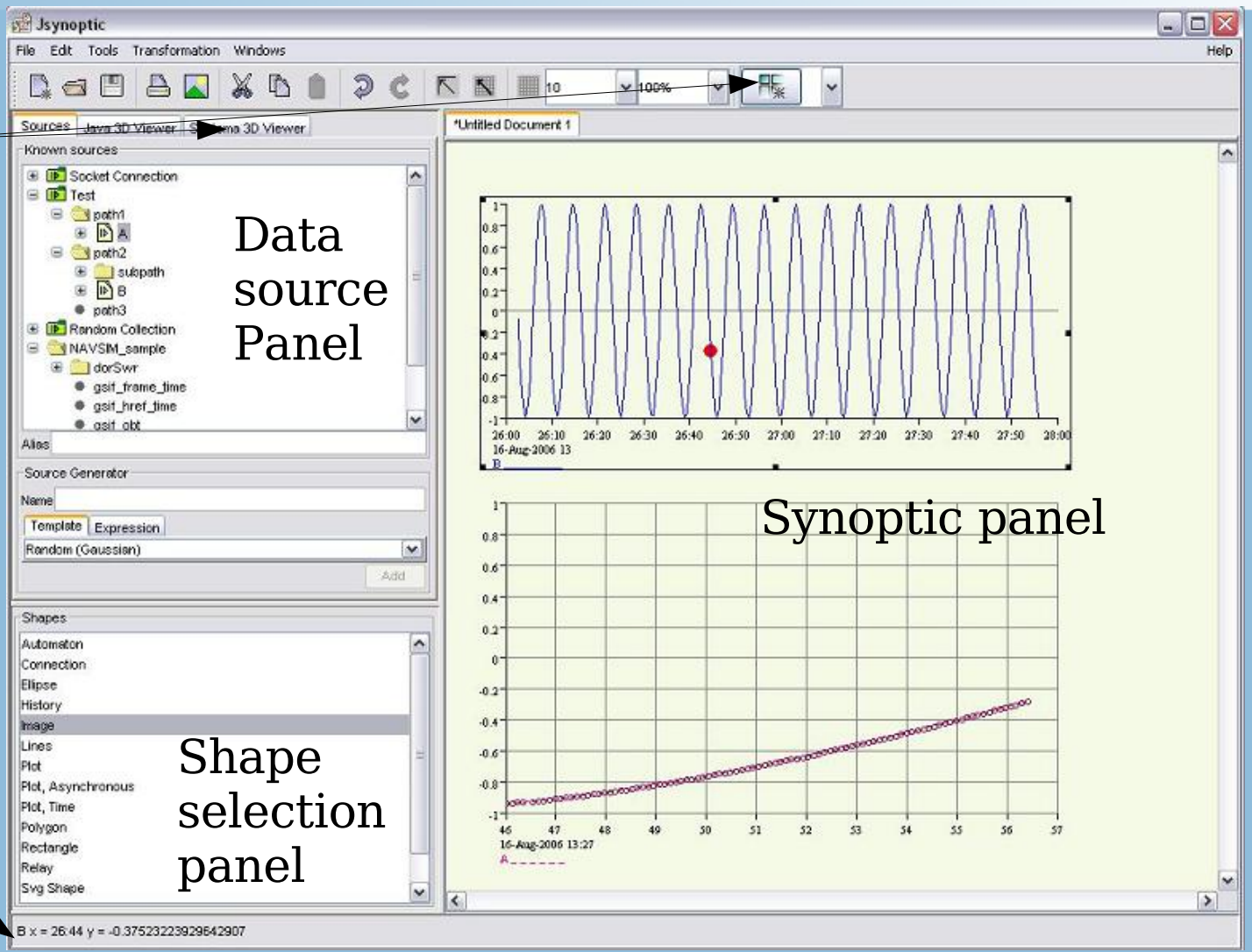
- Open data files
  - Computation results, archives, ...
  - Text and binary formats.
  - Static, or with dynamic replay.
- Display data
  - Using the same synoptics as for the live display.
  - With more plots, etc, for analysis.
- On-the-fly mathematical expressions.

JSynoptic – Visual Guide

User plugins

Source generator and math.

Status bar



Data source Panel

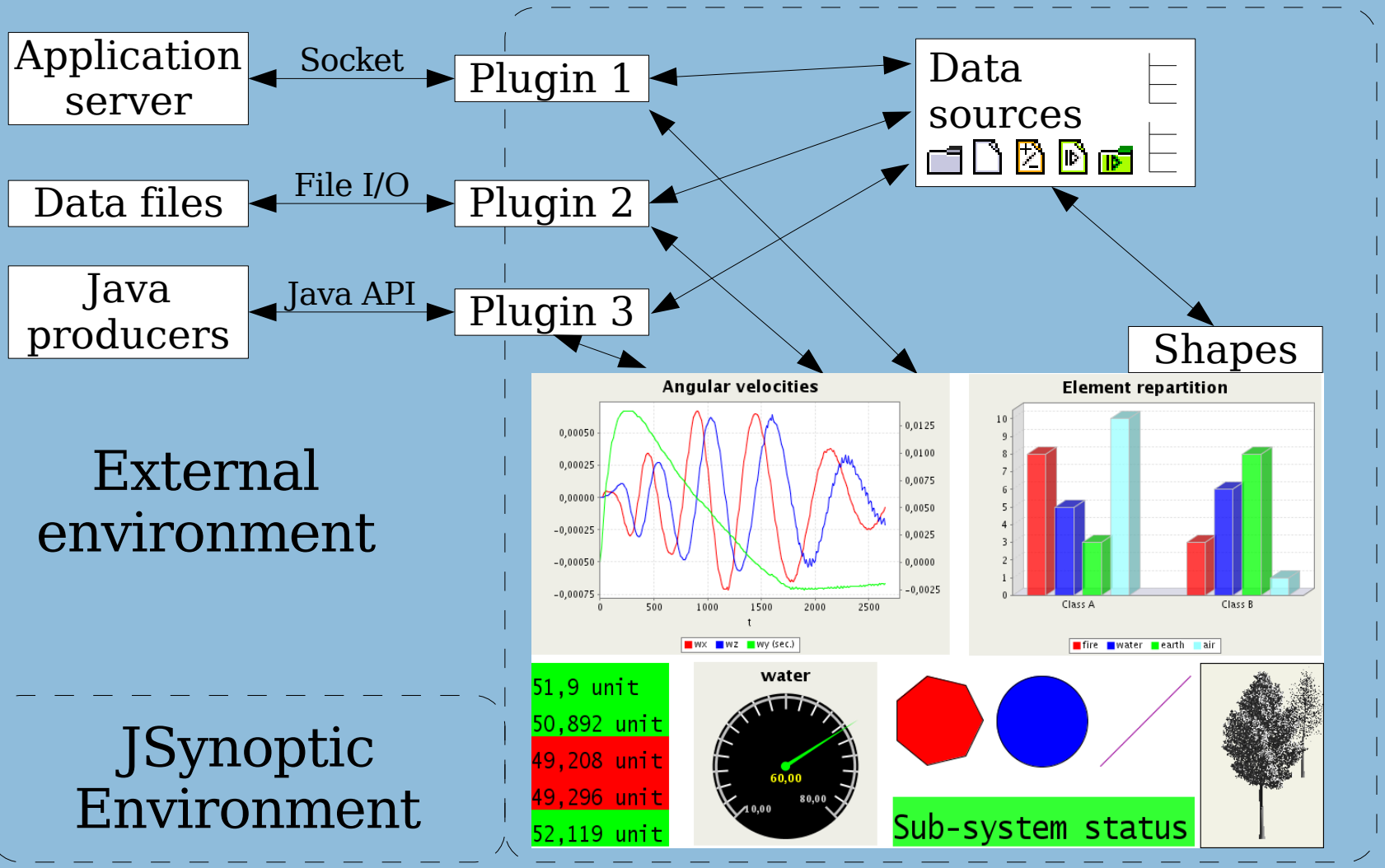
Synoptic panel

Shape selection panel

JSynoptic - Data sources

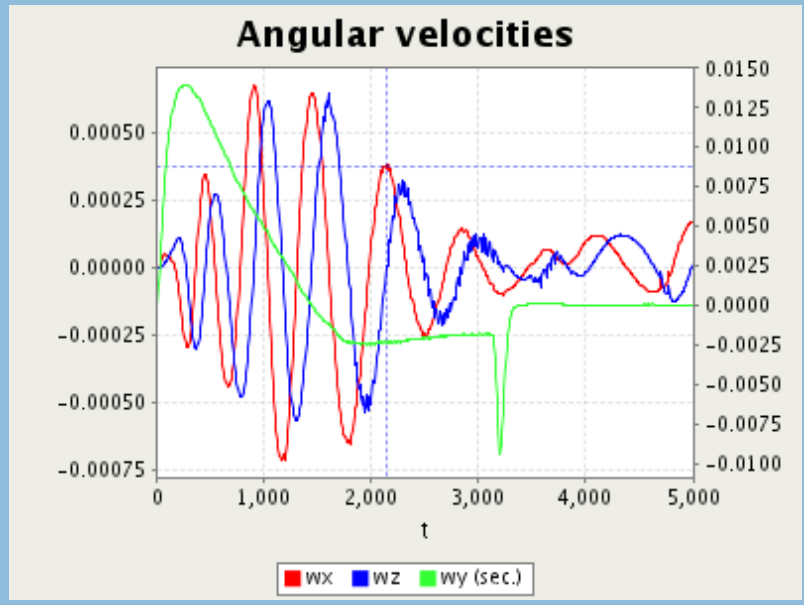
- Data sources can be of any type
  - Numeric sources (Floating-point or Integers)
  - Text data sources
  - User-defined classes with plugins
- Data sources can be dynamic
  - Internal animation for archive replay 
  - Asynchronous external connections, like sockets
  - Changes on the source are notified to the shapes
- Hierarchical display by consistent collections

JSynoptic – Data flow



JSynoptic – Basic shapes

- Standard Plot
  - Corresponds to y = f(x) functions => supposes the data source for x is monotonous.
  - Can have a secondary Y axis
  - Auto-updates to the data sources used
  - Based on JfreeChart
- Optimized plot
  - When performance matters more than appearance

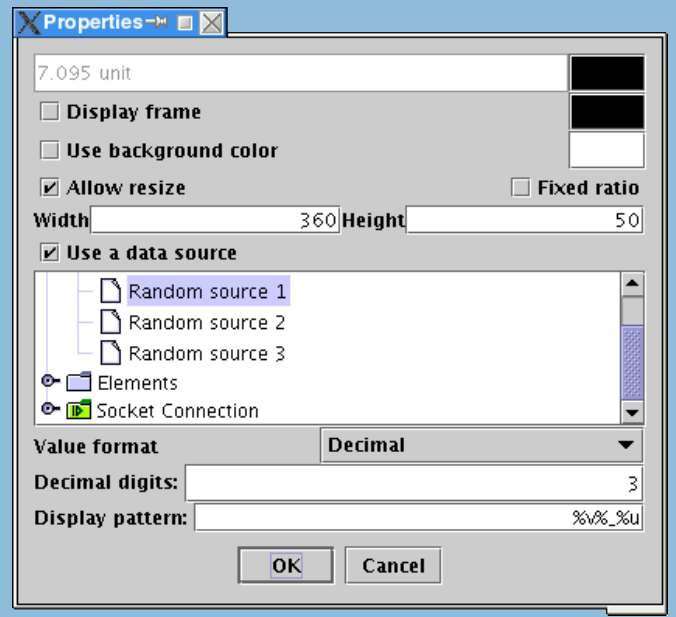


JSynoptic – Basic shapes

- Text Shapes
  - Can be any text
  - Can be connected to a data source
  - Can register data history

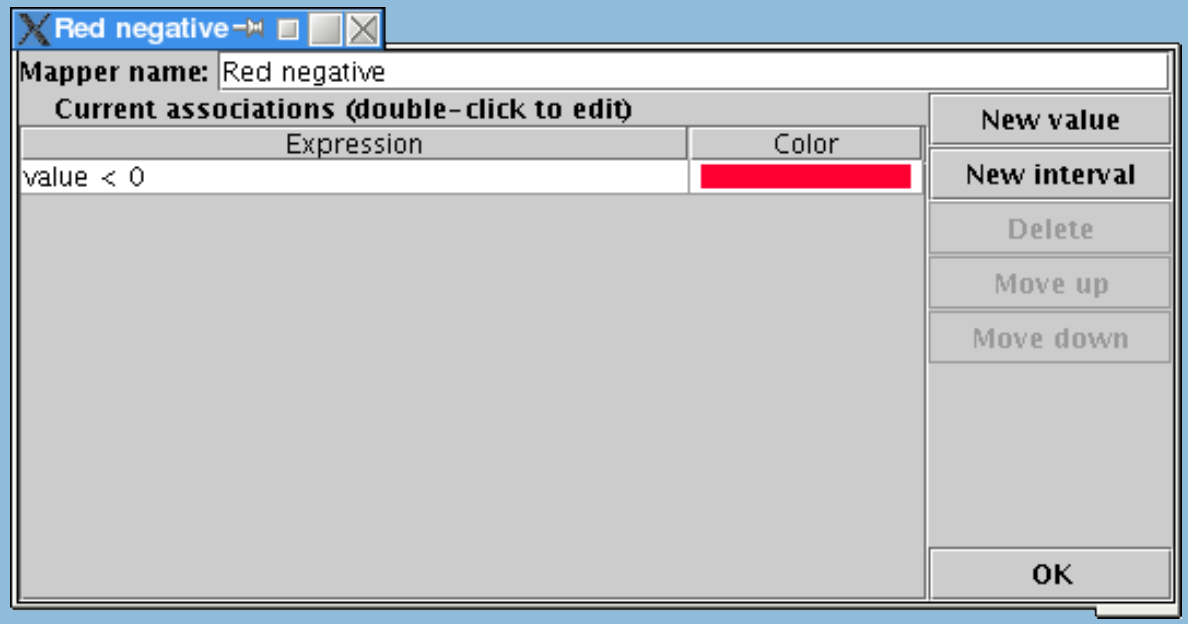
51,9 unit
50,892 unit
49,208 unit
49,296 unit
52,119 unit

z
26
vingt-six
XXVI



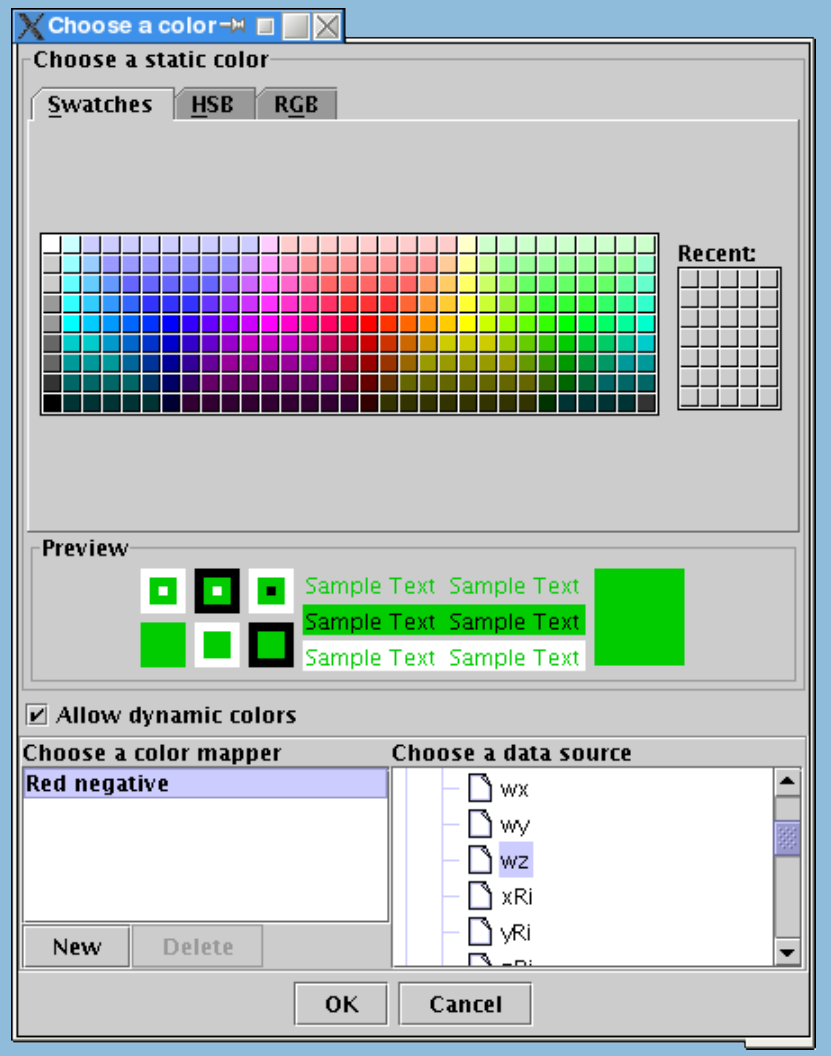
JSynoptic – Setting “Alarms”

- Principles
  - A property of the shape is changed conditionally.
  - Mappers: numerical values to properties.
  - Example with colors:



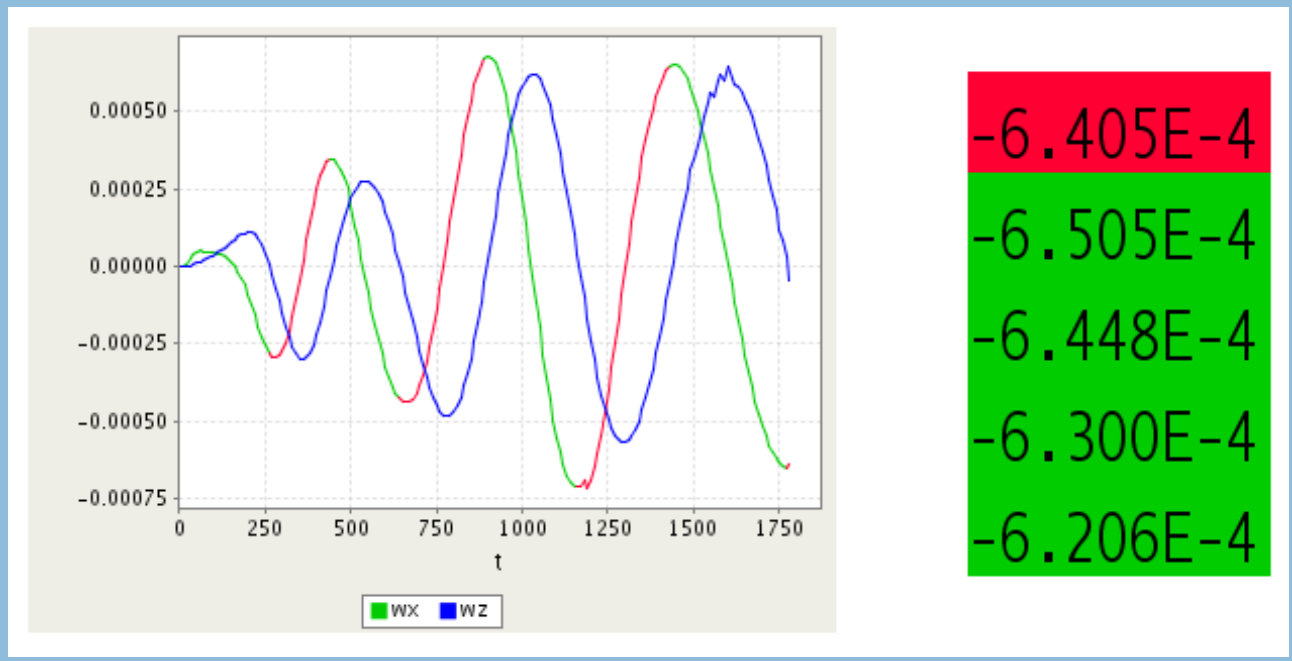
JSynoptic – Setting “Alarms”

- Principles (continued)
  - A data source provides values for the mapper.
  - The source / mapper combination then defines a dynamic color.
  - Many objects using colors can also use dynamic colors.
- Mappers can also define text labels and images.



JSynoptic – Setting “Alarms”

- Example on the 2 basic shapes
  - In this example, a Standard Plot and a History shape were both set to use dynamic colors.



JSynoptic – Hyperlink system

- Links
  - When a shape represents a sub-system, a link allows to open this sub-system.
  - Links are useful in combination with alarms to investigate what's going on hierarchically.

Demo


alarms.syn

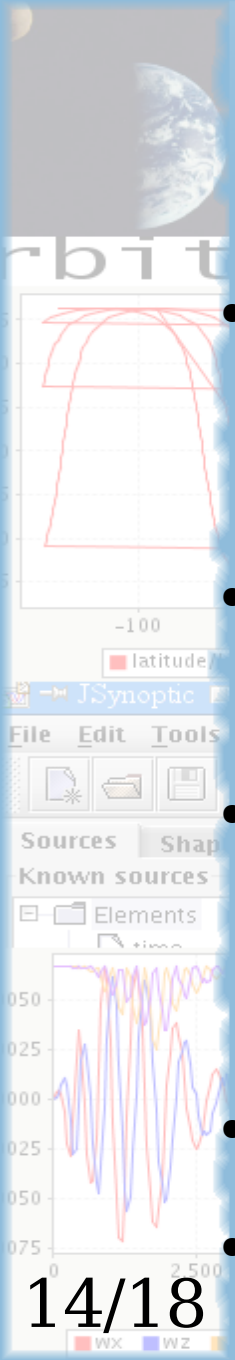
JSynoptic – More Graphs

- Other graph types from JFreeChart
  - Parametric
  - Pie Chart
  - Scatter Plot
  - Bar Chart
  - Cyclic Chart
  - Meter plot

- Custom shapes for more performances, like asynchronous plots, or Java3D/openGL viewers
- Framework for custom needs with plugins

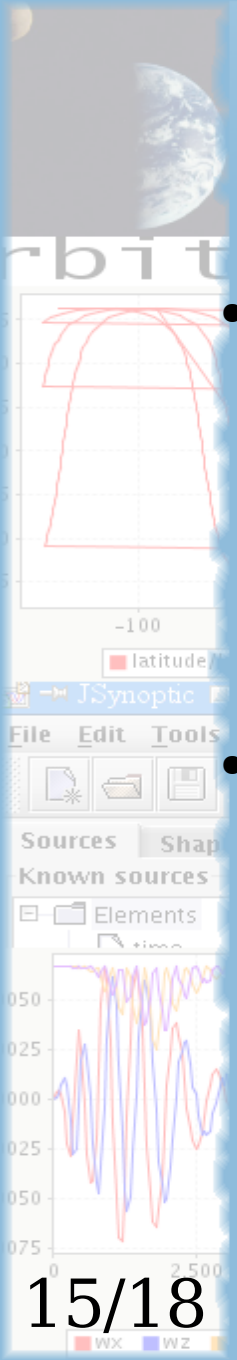
JSynoptic - Mathematics

- Data sources can be generated from a mathematical expression:
  `3cos(x)^2, min(2x,-y), x^2/(3y)...`
- Variables are data sources, named or aliased
  - Properties are kept, like synchronous or dynamic.
- On-the-fly evaluation.
  - The expression may be changed for investigations
  - All plots and shapes reflect the change.
- All standard java.Math functions are known
- User-defined functions are auto-detected.

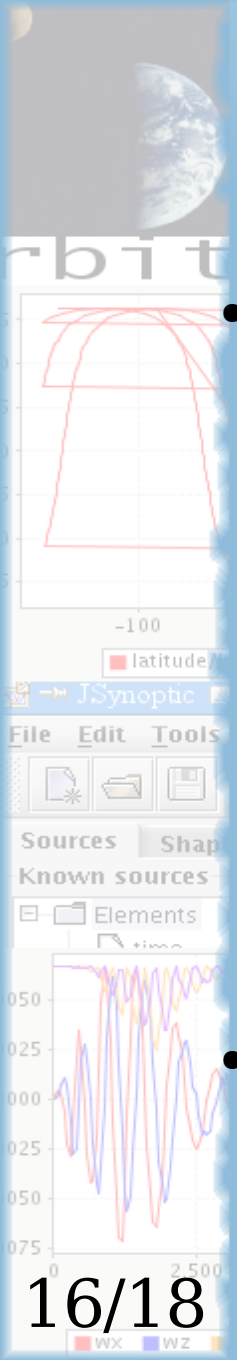


JSynoptic – Saving synoptics

- Synoptics are presentation templates
  - Graphical layout can be re-used for comparison purposes, between experiment runs, replays, etc.
  - Links for making hierarchical synoptics are saved as relative links to the current document for portability.
- Data source values are not saved
  - Only the references are saved
    ⇒ The same synoptic can load different data
  - Data may not be persistent (socket connection...)
    ⇒ Irrelevant to save the values
  - But the parameters are saved. For example, the system proposes to reload the previous ASCII file.



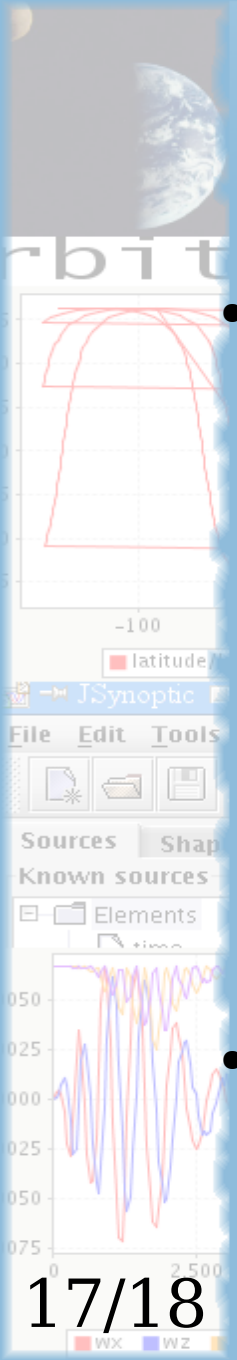
JSynoptic – Integration



- Deployment is easy
  - An installer is provided
  - No need to hack configuration files
  - No external dependency, the plugins can bring their own libraries
  - The plugins are simply copied and auto-detected
  - 100% pure Java : The JDK from Sun is available on all major platforms
- Batch mode and command-line arguments
  - Launching JSynoptic with default Synoptic and data
  - Batch printing

JSynoptic – Adapting

- Powerful plugin architecture
  - Plugins can add new file formats
  - Plugins can add new sources (source templates, network connections, etc...)
  - Plugins can add new shapes
  - Plugins can add mathematical functions
  - Plugins can customizing the GUI (menus, more tabs in editor...)
- Even the basic features are brought by plugins
  - Any plugin can bring at least equivalent features
  - This validates the framework



JSynoptic – Open Source

- Using SourceForge facilities
  - Centralized development using CVS, accessible from anywhere in the world
  - High activity, but web site lags behind.
- JSynoptic is distributed with the LGPL License
  - It can be integrated into any project, and modified to fit specific needs.
  - No dependency on an software editor, users can really contribute and keep the project alive.
- You're welcome to give it a try, and modify it to fit your needs!