Elettra Sincrotrone Trieste

New Developments for eGiga2m Historic Database Web Visualizer

eGiga is an historic database web visualizer since 2002. At the beginning it was connected to a proprietary database schema, support for other schemas was added later, for example HDB and HDB++. eGiga was deeply refactored in 2015 becoming eGiga2m. Between 2022 and 2023 a few improvements have been made, among them, optimization of large data extraction, improvement of images and pdf exports, substitution of 3d chart library with a touch screen enabled one; the addition of: logger status info, a new canvas responsive chart library, adjustable splitter, support for TimescaleDB and HDF5 data format, correlations and time series analysis, and ARIMA (autoregressive integrated moving average) forecast.

Time series analysis

A set of micro services,modular and expandable

List of time series analysis tools

add

Add element by element of all timeseries selected (ts[i]); each timeseries is multiplied for a constant (m[i]) plus an additive constant (a)
a + m[0]*ts[0] + m[1]*ts[1] + m[2]*ts[2] + ...

diff

Difference from the previous element of timeseries considering or not the time difference.
This is a sort of discrete derivate

fft

FFT from R package; apply to no more than one time series at a time
not supported by Flot
WARNING this tool is experimental

forecast

Forecast from R ARIMA package; apply to no more than one time series at a time
user can provide seasonal frequency
only a few parameters are implemented, not supported by Flot
WARNING this tool is experimental and forecasts can be inaccurate or even misleading

interpolator

Transform timeseries from an unequally spaced points in time to equally spaced.
The requested period should be congruent with average period and Nyquist frequency

max

Maximum value from the beginning of the timeseries or in a moving window (discrete upper envelope)

min

Minimum value from the beginning of the timeseries or in a moving window (discrete lower envelope)

movingaverage

Moving average, based only on a number of samples after and before or on time distance weights

mul

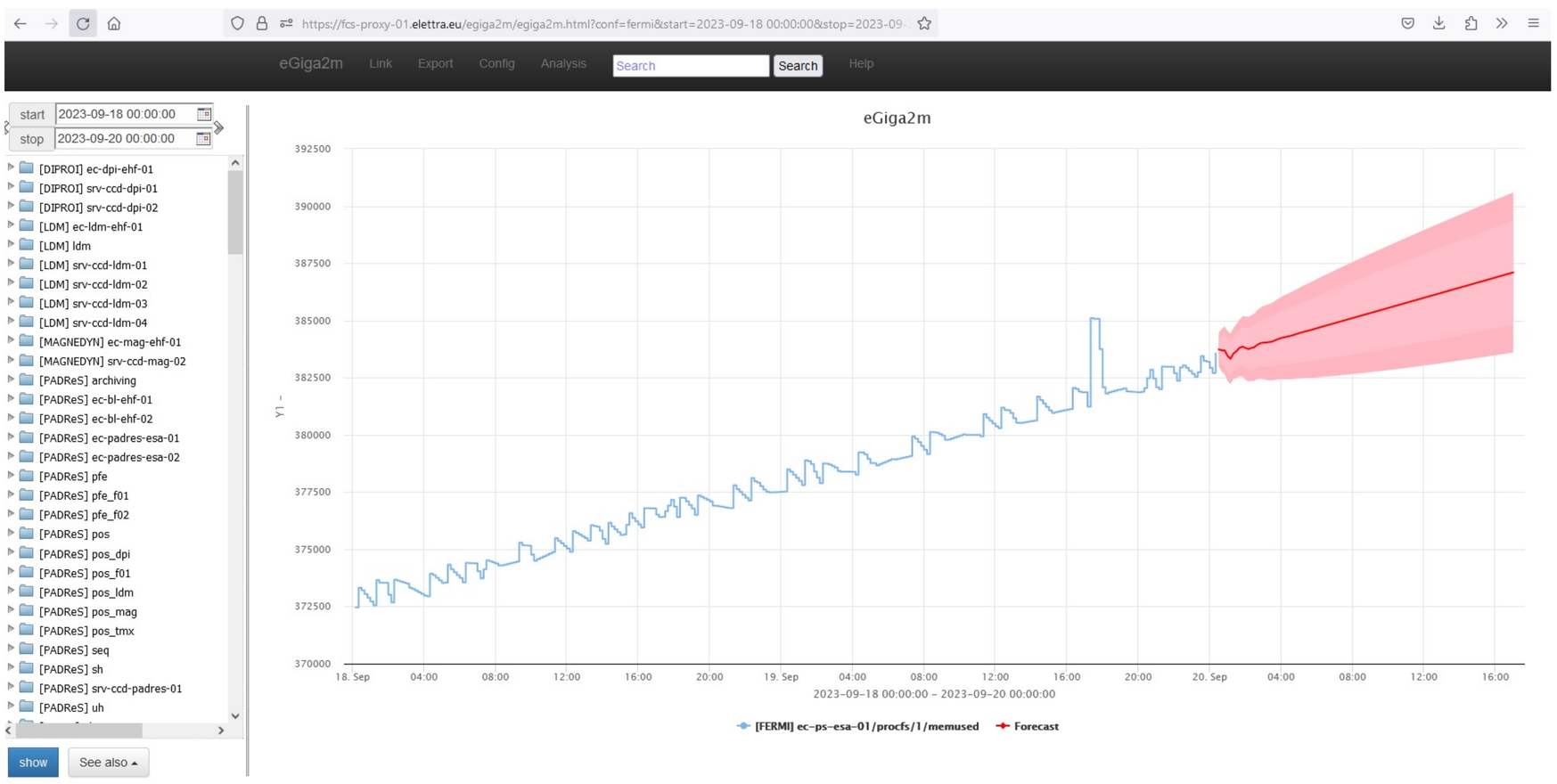
Multiply element by element of all timeseries selected (ts[i]); each timeseries is rised to a constant (e[i])
m * ts[0]*e[0] * ts[1]*e[1] * ts[2]*e[2] * ...

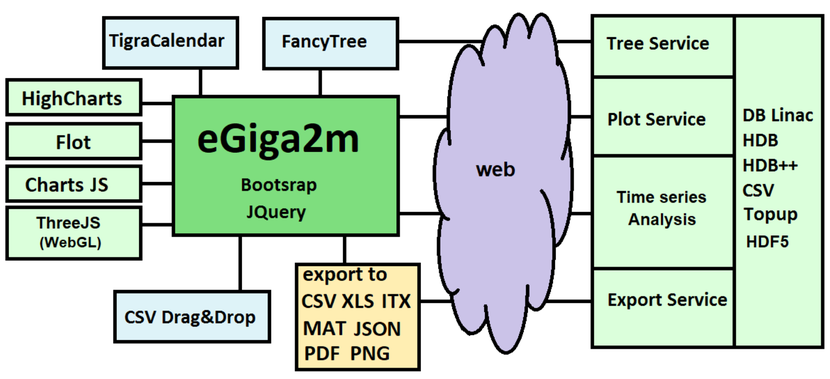
sum

Add all elements of timeseries from the beginning considering or not the time difference.
This is a sort of discrete integral

ARIMA forecast

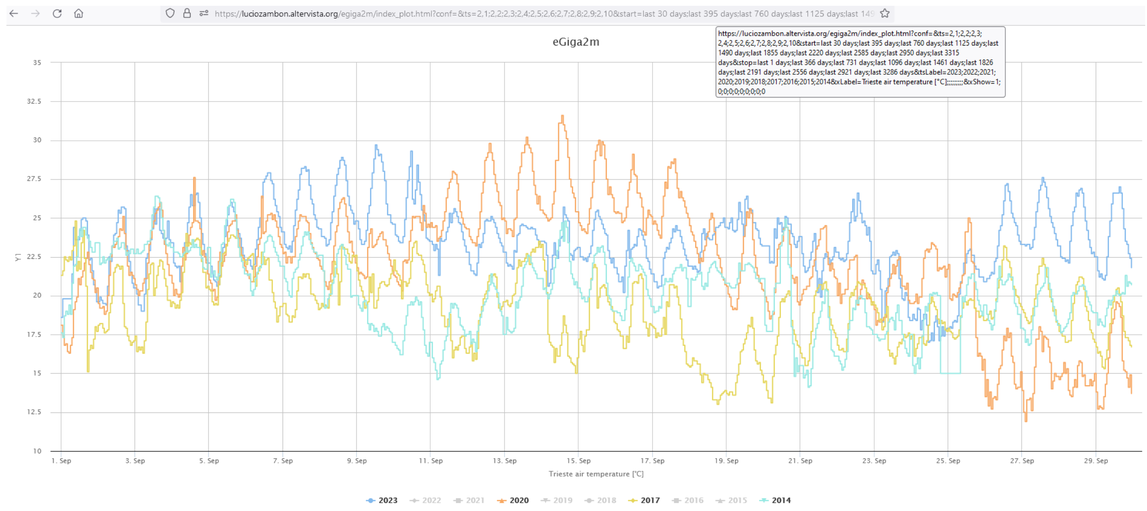
Forecasts are experimental and should be validated by users





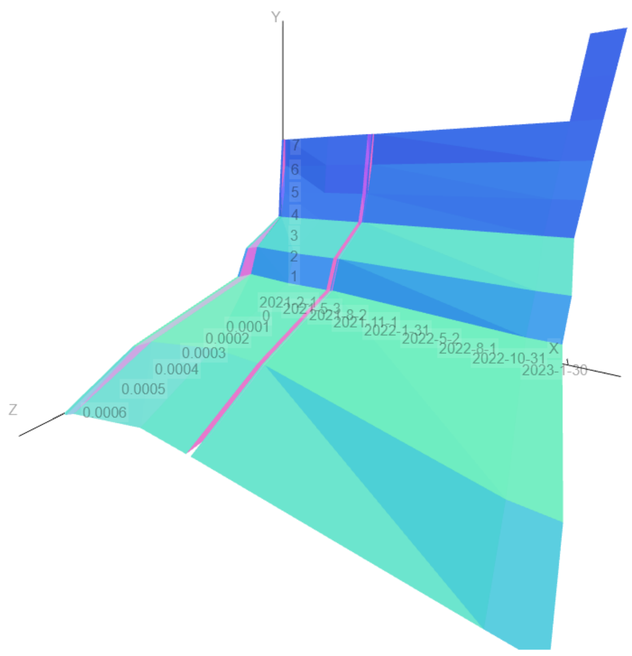
Multiple X axes

The same time series is shown over different time intervals and all X axes except one are hidden



New 3D graph with support for touch screen

A WebGL library was used from 2015. It has been substituted with ThreeJS which supports touch screen gestures



Support for HDF5 data format

A library has been used to convert from HDF5 to JSON. The eGiga2m chart is embedded in another web page with other data representations

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