Tutorial 3

Descriptive Statistics

The **Analysis** layer of INA can be viewed as a "hub" that connects all the analysis methods implemented in the library. We will follow the exercise started in Tutorials #1 and #2 and will explore first the "Descriptive Statistics" functionality. While the functions described in the first two tutorials follow a rather "linear" approach, the linear structure breaks down in the analysis layer where the user can choose to follow different branches depending on the analyses of interest. The branching of INA, together with the "BACK" functionality, allows the user to apply the whole set of analysis methods on exactly the same time series, giving thus a complete picture of the statistical properties of the time series under analysis. The individual classes of analysis methods can also be accessed from the fixed buttons on the left.

The **Descriptive Statistics** analysis class is designed as a "first look" to the data and contains two subclasses of methods: a) **Periodogram** and b) **Histogram**.

The two subclasses contain intentionally a very limited number of adjustable settings (in fact, only one per subclasses), and can be used as a "first degree" estimate of some basic statistical properties of the time series. The methods are based on the built-in MATLAB functions: periodogram (which gives a simple nonparametric estimate of the PSD of the input signal using a given window selected by the user from the dropdown menu located at the top of the right panel of the layer), and hist (which creates a histogram bar plot of the elements of the input signal, y, sorted into a user defined number of equally spaced bins along the x-axis between the minimum and maximum values of y).

Screenshots from the **Descriptive Statistics** layer are displayed in Figures 1 and 2. The time series depicted in these figures, and also in all the following tutorials, is the standardized sample of the Bx component of the Cluster FGM measurements downloaded from CSA and "uploaded" in Tutorial #1.
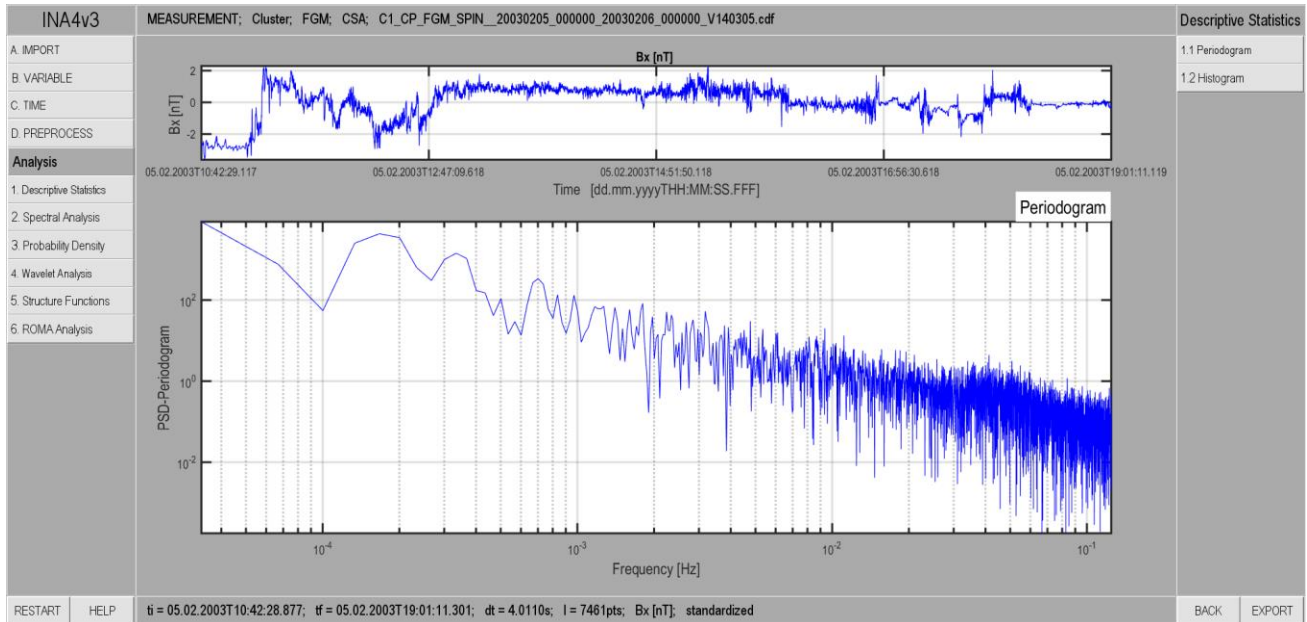
Figure 1. Illustration of the window that opens when the user clicks the "Descriptive Statistics" button. The two buttons of the right hand side panel can perform a periodogram analysis or compute a histogram of the current signal. The central panel displays the selected variable in the upper plot and the result of the selected analysis in the lower plot, in this example the periodogram.
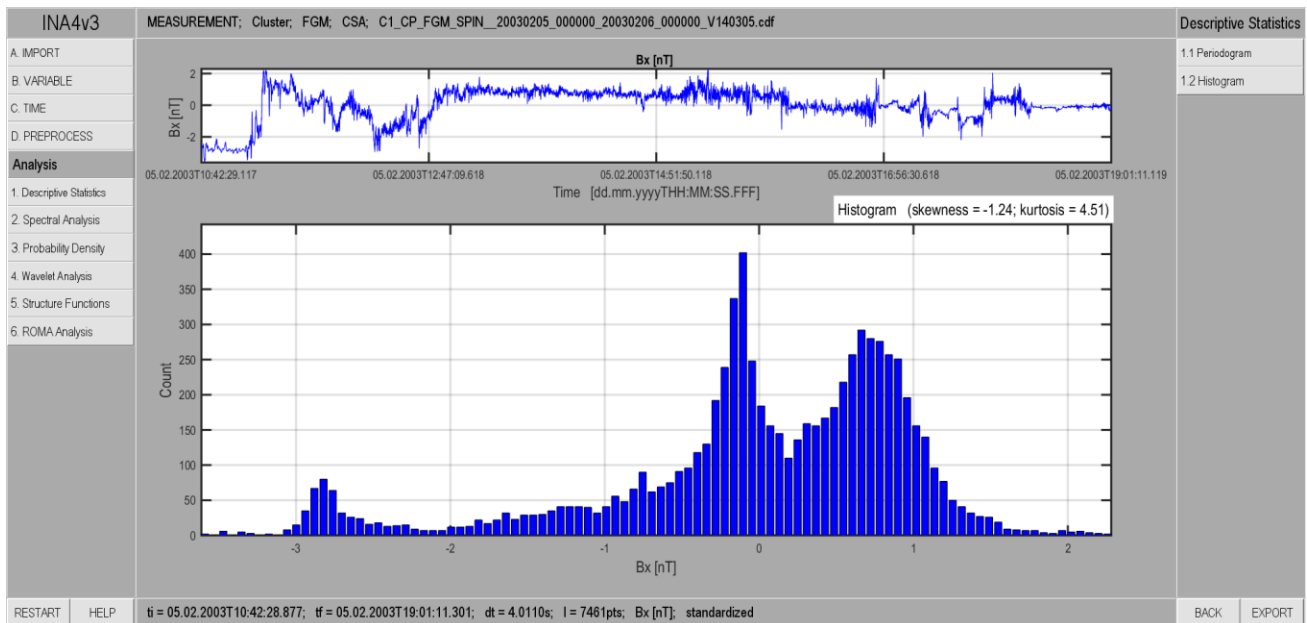

Figure 2. Same as figure 1, it illustrates the "Histogram" analysis of the selected time series.