Histogram

On this page

Cameo Simulation Toolkit introduces built-in support for Monte Carlo analysis, allowing you to manage uncertainties and estimate how random variation of sensitive parameters affects the overall performance of the system being modeled. A Histogram shows the density of the underlying distribution of data and estimates the probability density function of underlying variables. The total area of the Histogram used for probability density is always normalized to 1. A Histogram also allows you to dynamically view updates on those statistical values during the simulation. In addition, you can customize the properties, including title, plot color, and labels. For more information about using the Histogram in your model, see the built-in HingeMonteCarloAnalysis.mdzip sample as a demonstration.
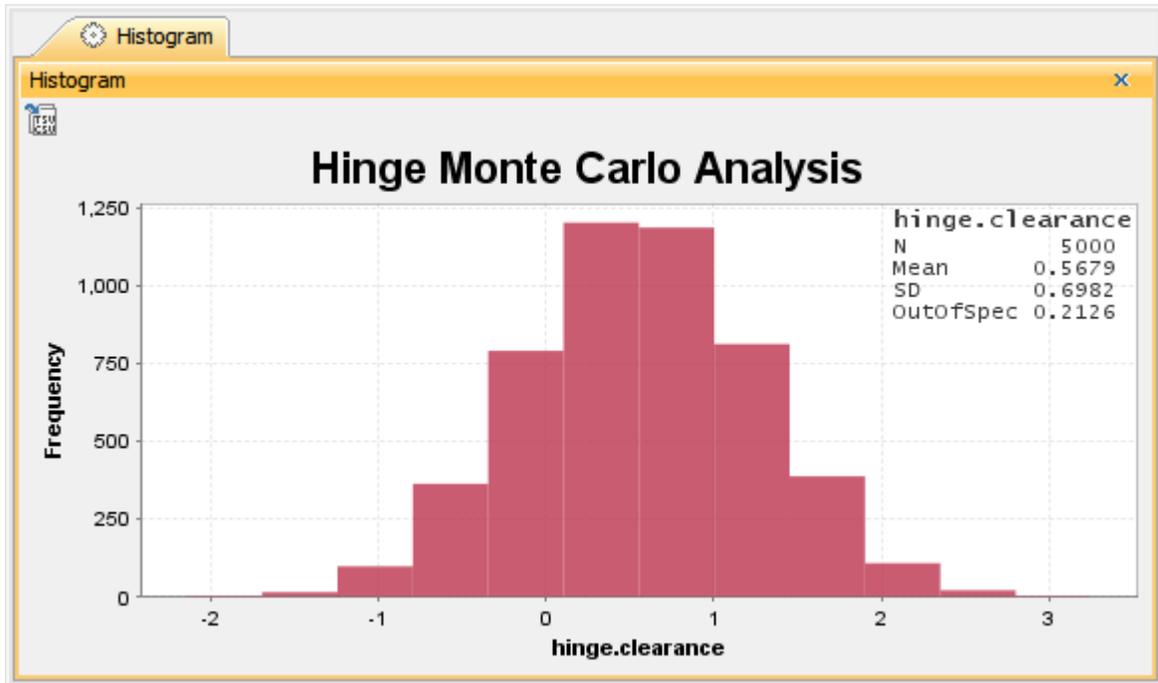
A Histogram with dynamic statistical results (N, Mean, SD, and OutOfSpec).

Properties of the Histogram

The Specification dialog of the Histogram contains the properties you can select and modify to change the display of the Histogram, as shown below.
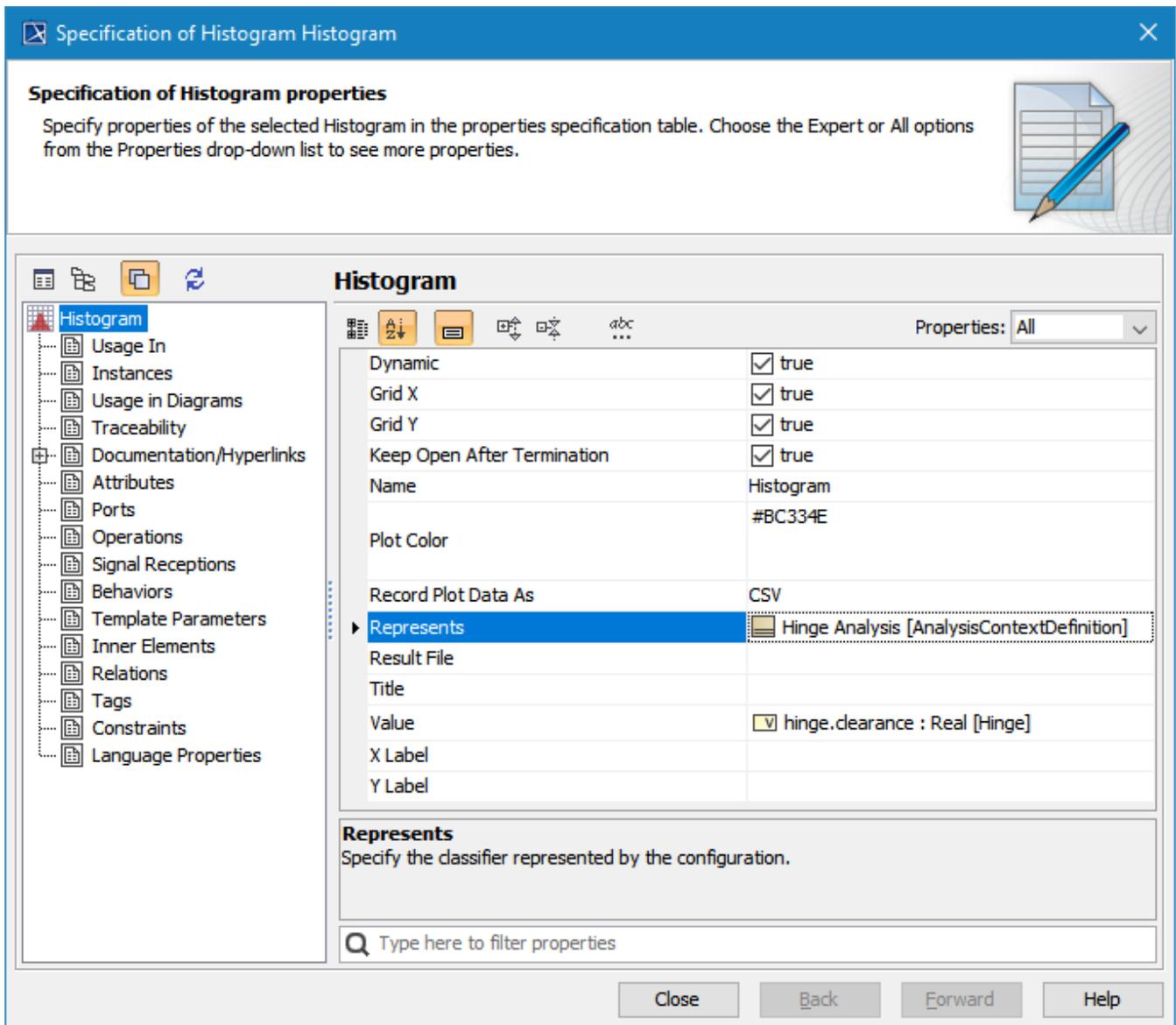
The properties of the Histogram in its Specification dialog.

The following table describes the function of each property in the Specification dialog of the Histogram

Property	Function
Dynamic	If true, opening the Histogram during multiple executions shows dynamic results. Otherwise, the Histogram will be open when all executions are completed. ⚠️ **Note** When the **Dynamic** property is set to **true**, the animation of the Histogram with dynamic statistical results (**N**, **Mean**, **SD**, and **OutOf Spec**) is available.
Grid X	To show or hide a vertical grid line.
Grid Y	To show or hide a horizontal grid line.
Plot Color	To specify a plot color.
Record Plot Data As	To specify the selected format of the file to be saved if **Result File** is specified.
Result File	To specify the file name to be saved from the results in the selected file format specified in the **Record Plot Data As** property. Otherwise, the results will be saved into model elements.

Title	To specify the title of the Histogram.
X Label	To specify the label of the x-axis of the Histogram.
Y Label	To specify the label of the y-axis of the Histogram.

> **Note**
> The Histogram can be used only as a local user interface, and the **Number Of Runs «SimulationConfig»** must be more than 1.

Using the Histogram

To use the Histogram

1. Create a Histogram element to a **Represents** Classifier, e.g., *Hinge Analysis*.
2. In the Specification window, specify the **Value** tag definition and properties whose values will be monitored in the Histogram. These properties must be the members of the Classifier represented by the Histogram element, e.g., *hinge.clearance*.
3. Set other properties as necessary, as shown in the property table, e.g., **Name**, **Title**, and **Dynamic**.
4. Drag the Histogram to the **Monte Carlo Analysis** «SimulationConfig».
5. Verify that **UI = Histogram** is shown in the «SimulationConfig».
6. Run the **Monte Carlo Analysis** «SimulationConfig».

> **Tips**
> You can export the Histogram data as a CSV file by clicking the ![icon] icon at the top-left of the Histogram pane. The Histogram is exported as a CSV file, shown below.

```
1    hinge.clearance
2    0.4228
3    0.6714
4    0.5427
5    1.2145
6    0.1397
7    0.7779
8    -0.1842
9    1.1790
10   1.8952
11   0.5194
12   0.0732
13   -0.1938
14   0.6281
15   -0.8757
16   0.6920
17   0.6518
18   -0.2676
```

The Histogram is exported as a CSV file.