

See Also

The figure “Comparison of area, faverage and mean functions over interval (12.75,13.32)”, in the **Details** section of the **faverage** function.

Integrate, areaXY, faverage, faverageXY, Poly2D Example 3

areaXY

areaXY(*XWaveName*, *YWaveName* [, *x1*, *x2*])

The areaXY function returns the signed area between the named *YWaveName* and the line $y=0$ from $x=x1$ to $x=x2$ using trapezoidal integration with X values supplied by *XWaveName*.

This function is identical to the **area** function except that it works on an XY wave pair and does not work with complex waves.

Details

If *x1* and *x2* are not specified, they default to $-\infty$ and $+\infty$, respectively.

If *x1* or *x2* are outside the X range of *XWaveName*, areaXY limits them to the nearest X range limit of *XWaveName*.

If any values in the Y range are NaN, areaXY returns NaN.

If any values in the entire X wave are NaN, areaXY returns NaN.

The function returns NaN if the input wave has zero points.

Reversing the order of *x1* and *x2* changes the sign of the returned area.

If *x1* or *x2* are not found in *XWaveName*, a Y value is found by linear interpolation based on the two bracketing X values and the corresponding values from *YWaveName*.

The values in *XWaveName* may be increasing or decreasing. AreaXY assumes that the values in *XWaveName* are monotonic. If they are not monotonic, Igor does not complain, but the result is not meaningful. If any X values are NaN, the result is NaN.

See the figure “Comparison of area, faverage and mean functions over interval (12.75,13.32)”, in the **Details** section of the **faverage** function.

The areaXY operation is intended to work on 1D waves only.

Examples

```
Make/O/N=101 Xdata, Ydata
Xdata = x*pi/100
Ydata = sin(Xdata[p])
Print areaXY(Xdata, Ydata, 0, Pi)           // the entire X range, and no more
Print areaXY(Xdata, Ydata)                  // same as -infinity to +infinity
Print areaXY(Xdata, Ydata, Inf, -Inf)       // +infinity to -infinity
```

The following is printed to the history area:

```
Print areaXY(Xdata, Ydata, 0, Pi)           // the entire X range, and no more
1.99984
Print areaXY(Xdata, Ydata)                  // same as -infinity to +infinity
1.99984
Print areaXY(Xdata, Ydata, Inf, -Inf)       // +infinity to -infinity
-1.99984
```

The $-\text{Inf}$ value was limited to 0, and Inf was limited to Pi to stay within the X range of data.

See Also

Integrate, area, faverage, faverageXY, Poly2D Example 3

asin

asin(*num*)

The asin function returns the inverse sine of num in radians in the range $[-\pi/2, \pi/2]$.

In complex expressions, *num* is complex, and asin returns a complex value.

See Also

sin