```
Make/O/C cInput=cmplx(sin(p/8), cos(p/8))
Make/O/C/N=0 cOutput
Differentiate/C cInput /D=cOutput
```

Wave Parameters

Note:	***All*** wave parameters must follow *yWave* in the command. All wave parameter flags and type flags must appear immediately after the operation name.
/D=*destWave*	Specifies the name of the wave to hold the differentiated data. It creates *destWave* if it does not already exist or overwrites it if it exists.
/X=*xWave*	Specifies the name of the corresponding X wave.

Details

If the optional /D = *destWave* flag is omitted, then the wave is differentiated in place overwriting the original data.

When using a method that deletes points (/EP=1) with a multidimensional wave, deletion is not done if no dimension is specified.

When using an X wave, the X wave must match the Y wave data type (excluding the complex type flag) and it must be 1D with the number points matching the size of the dimension being differentiated. X waves are not used with integer source waves.

`Differentiate/METH=1/EP=1` is the inverse of `Integrate/METH=2`, but `Integrate/METH=2` is the inverse of `Differentiate/METH=1/EP=1` only if the original first data point is added to the output wave.

Differentiate applied to an XY pair of waves does not check the ordering of the X values and doesn't care about it. However, it is usually the case that your X values should be monotonic. If your X values are not monotonic, you should be aware that the X values will be taken from your X wave in the order they are found, which will result in random X intervals for the X differences. It is usually best to sort the X and Y waves using **Sort**.

See Also

The **Integrate** operation.

digamma

digamma(*x*)

The digamma function returns the digamma, or psi function of *x*. This is the logarithmic derivative of the gamma function:

$$\Psi(z) \equiv \frac{d}{dz}\ln\left(\Gamma(z)\right) = \frac{\Gamma'(z)}{\Gamma(z)}.$$

In complex expressions, *x* is complex, and `digamma(x)` returns a complex value.

Limited testing indicates that the accuracy is approximately 1 part in 10^{16}, at least for moderately-sized values of *x*.

Dilogarithm

Dilogarithm(*z*)

Returns the Dilogarithm function for real or complex argument *z*. The dilogarithm is a special case of the polylogarithm defined by

$$Li_2(z) = \sum_{k=1}^{\infty} \frac{z^k}{k^2}.$$

The dilogarithm function was added in Igor Pro 7.00.

See Also

zeta