Details

If *destWaveName* exists, DWT overwrites it; if it does not exist, DWT creates it.

When used in a function, the DWT operation automatically creates a wave reference for the destination wave. See **Automatic Creation of WAVE References** on page IV-72 for details.

If *destWaveName* is not specified, the DWT operation stores the results in W_DWT for 1D waves and M_DWT for higher dimensions.

When working with 1D waves, the transform results are packed such that the higher half of each array contains the detail components and the lower half contains the smooth components and each successive scale is packed in the lower elements. For example, if the source wave contains 128 points then the lowest scale results are stored in elements 64-127, the next scale (power of 2) are stored from 32-63, the following scale from 16-31 etc.

Example

```
Make/O/N=1024 testData=sin(x/100)+gnoise(0.05)
DWT /S/N=20/V=25 testData, smoothedData
```

See Also

For continuous wavelet transforms use the **CWT** operation. See the **FFT** operation.

For further discussion and examples see **Discrete Wavelet Transform** on page III-283.

e

e

The e function returns the base of the natural logarithm system (2.7182818…).

EdgeStats

EdgeStats [***flags***] ***waveName***

The EdgeStats operation produces simple statistics on a region of a wave that is expected to contain a single edge. If more than one edge exists, EdgeStats works on the first one found.

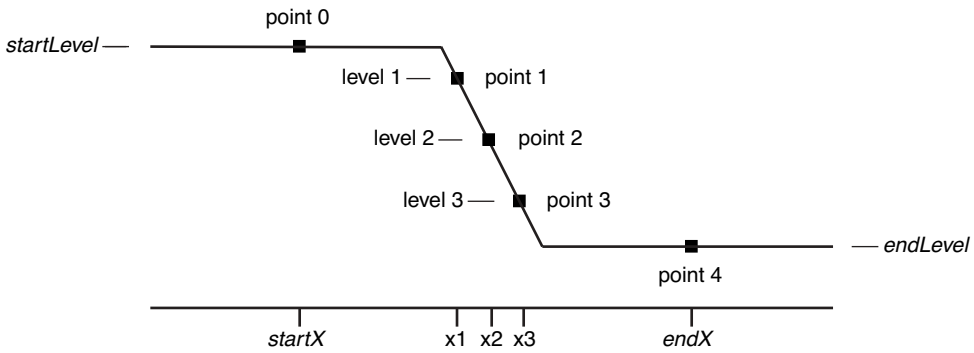
Flags

/A=*avgPts*	Determines *startLevel* and *endLevel* automatically by averaging *avgPts* points at centered at *startX* and *endX*. Default is /A=1.
/B=*box*	Sets box size for sliding average. This should be an odd number. If /B=*box* is omitted or *box* equals 1, no averaging is done.
/F=*frac*	Specifies levels 1, 2 and 3 as a fraction of (*endLevel-startLevel*): level1 = *frac** (*endLevel-startLevel*) + *startLevel* level2 = 0.5 * (*endLevel-startLevel*) + *startLevel* level3 = (1-*frac*) * (*endLevel-startLevel*) + *startLevel* The default value for *frac* is 0.1 which makes level1 the 10% level, level2 the 50% level and level3 the 90% level. *frac* must be between 0 and 0.5.
/L=(*startLevel*, *endLevel*)	Sets *startLevel* and *endLevel* explicitly. If omitted, they are determined automatically. See /A.
/P	Output edge locations (see **Details**) are returned as point numbers. If /P is omitted, edge locations are returned as X values.
/Q	Prevents results from being printed in history and prevents error if edge is not found.
/R=(*startX*,*endX*)	Specifies an X range of the wave to search. You may exchange *startX* and *endX* to reverse the search direction.

/R=[*startP*,*endP*]	Specifies a point range of the wave to search. You may exchange *startP* and *endP* to reverse the search direction. If /R is omitted, the entire wave is searched.
/T=*dx*	Forces search in two directions for a possibly more accurate result. *dx* controls where the second search starts.

Details

The /B=*box*, /T=*dx*, /P, and /Q flags behave the same as for the **FindLevel** operation.



EdgeStats considers a region of the input wave between two X locations, called *startX* and *endX*. *startX* and *endX* are set by the /R=(*startX*,*endX*) flag. If this flag is missing, *startX* and *endX* default to the start and end of the entire wave. *startX* can be greater than *endX* so that the search for an edge can proceed from the "right" to the "left".

The diagram above shows the default search direction, from the "left" (lower point numbers) of the wave toward the "right" (higher point numbers).

The *startLevel* and *endLevel* values define the base levels of the edge. You can explicitly set these levels with the /L=(*startLevel*, *endLevel*) flag or you can let EdgeStats find the base levels for you by using the /A=*avgPts* flag which averages points around *startX* and *endX*.

Given *startLevel* and *endLevel* and a *frac* value (see the /F=*frac* flag) EdgeStats defines level1, level2 and level3 as shown in the diagram above. With the default *frac* value of 0.1, level1 is the 10% point, level2 is the 50% point and level3 is the 90% point.

With these levels defined, EdgeStats searches the wave from *startX* to *endX* looking for level2. Having found it, it then searches for level1 and level3. It returns results via variables described below.

EdgeStats sets the following variables:

`V_flag`	0: All three level crossings were found. 1: One or two level crossings were found. 2: No level crossings were found.
`V_EdgeLoc1`	X location of level1.
`V_EdgeLoc2`	X location of level2.
`V_EdgeLoc3`	X location of level3.
`V_EdgeLvl0`	*startLevel* value.
`V_EdgeLvl1`	level1 value.
`V_EdgeLvl2`	level2 value.
`V_EdgeLvl3`	level3 value.
`V_EdgeLvl4`	*endLevel* value.
`V_EdgeAmp4_0`	Edge amplitude (*endLevel* - *startLevel*).
`V_EdgeDLoc3_1`	Edge width (x distance between point 1 and point 3).
`V_EdgeSlope3_1`	Edge slope (straight line slope from point 1 and point 3).