

Wave Reference Functions

It is common to write a user-defined function that operates on all of the waves in a data folder, on the waves displayed in a graph or table, or on a wave identified by a cursor in a graph. For these purposes, you need to use wave reference functions.

Wave reference functions are built-in Igor functions that return a reference that can be used in a user-defined function. Here is an example that works on the top graph. Cursors are assumed to be placed on a region of a trace in the graph.

```
Function WaveAverageBetweenCursors()
    WAVE/Z w = CsrWaveRef(A)
    if (!WaveExists(w))           // Cursor is not on any wave.
        return NaN
    endif

    Variable xA = xcsr(A)
    Variable xB = xcsr(B)
    Variable avg = mean(w, xA, xB)

    return avg
End
```

CsrWaveRef returns a wave reference that identifies the wave a cursor is on.

An older function, CsrWave, returns the *name* of the wave the cursor is on. It would be tempting to use this to determine the wave the cursor is on, but it would be incorrect. The name of a wave by itself does not uniquely identify a wave because it does not specify the data folder in which the wave resides. For this reason, we usually need to use the wave reference function CsrWaveRef instead of CsrWave.

This example uses a wave reference function to operate on the waves displayed in a graph:

```
Function SmoothWavesInGraph()
    String list = TraceNameList("", ";", 1)
    String traceName
    Variable index = 0
    do
        traceName = StringFromList(index, list)
        if (strlen(traceName) == 0)
            break          // No more traces.
        endif
        WAVE w = TraceNameToWaveRef("", traceName)
        Smooth 5, w
        index += 1
    while(1)
End
```

Use **WaveRefIndexedDFR** to iterate over the waves in a given data folder.

Here are the wave reference functions. See Chapter V-1, **Igor Reference**, for details on each of them.

Function	Comment
CsrWaveRef	Returns a reference to the Y wave to which a cursor is attached.
CsrXWaveRef	Returns a reference to the X wave when a cursor is attached to an XY pair.
WaveRefIndexedDFR	Returns a reference to a wave in the specified data folder.
WaveRefIndexed	Returns a reference to a wave in a graph or table or to a wave in the current data folder.
XWaveRefFromTrace	Returns a reference to an X wave in a graph. Used with the output of TraceNameList.