See also **NaNs, INFs and Missing Values** on page II-83 for more about how NaN values.

Some routines deal with missing values by ignoring them. The **CurveFit** operation (see page V-124) is one example. Others may produce unexpected results in the presence of missing values. Examples are the **FFT** operation and the **area** and **mean** functions.

Here are some strategies for dealing with missing values.

Replace the Missing Values With Another Value

You can replace NaNs in a wave with this statement:

```
wave0 = NumType(wave0)==2 ? 0:wave0    // Replace NaNs with zero
```

If you're not familiar with the :? operator, see **Operators** on page IV-6.

For multi-dimensional waves you can replace NaNs using **MatrixOp**. For example:

```
Make/O/N=(3,3) matNaNTest = p + 10*q
Edit matNaNTest
matNaNTest[0][0] = NaN; matNaNTest[1][1] = NaN; matNaNTest[2][2] = NaN
MatrixOp/O matNaNTest=ReplaceNaNs(matNaNTest,0)    // Replace NaNs with 0
```

Remove the Missing Values

For 1D waves you can remove NaNs using **WaveTransform** `zapNaNs`. For example:

```
Make/N=5 NaNTest = p
Edit NaNTest
NaNTest[1] = NaN; NaNTest[4] = NaN
WaveTransform zapNaNs, NaNTest
```

There is no built-in operation to remove NaNs from an XY pair if the NaN appears in either the X or Y wave. You can do this, however, using the RemoveNaNsXY procedure in the "Remove Points" WaveMetrics procedure file which you can access through Help→Windows→WM Procedures Index.

There is no operation to remove NaNs from multi-dimensional waves as this would require removing the entire row and entire column where each NaN appeared.

Work Around Gaps in Data

Many analysis routines can work on a subrange of data. In many cases you can just avoid the regions of data that contain missing values. In other cases you can extract a subset of your data, work with it and then perhaps put the modified data back into the original wave.

Here is an example of extract-modify-replace (even though Smooth properly accounts for NaNs):

```
Make/N=100 data1= sin(P/8)+gnoise(.05); data1[50]= NaN
Display data1
Duplicate/R=[0,49] data1,tmpdata1      // start work on first set
Smooth 5,tmpdata1
data1[0,49]= tmpdata1[P]               // put modified data back
Duplicate/O/R=[51,] data1,tmpdata1     // start work on 2nd set
Smooth 5,tmpdata1
data1[51,]= tmpdata1[P-51]
KillWaves tmpdata1
```

Replace Missing Data with Interpolated Values

You can replace NaN data values prior to performing operations that do not take kindly to NaNs by replacing them with smoothed or interpolated values using the **Smooth** operation (page V-878), the **Loess** operation (page V-515), or **The Interpolate2 Operation**.