

log

```
// Interpolate to dense waveform over X range
Make/O/D/N=100 fittedNOx
WaveStats/Q EquivRatio
SetScale/I x, V_Min, V_Max, "", fittedNOx
Loess/CONF={0.99,cp,cm}/DEST=fittedNOx/DFCT/SMTH=(2/3) srcWave=NOx, factors={EquivRatio}
Display NOx vs EquivRatio; ModifyGraph mode=3,marker=19
AppendtoGraph fittedNOx, cp,cm // fit and confidence intervals
ModifyGraph rgb(fittedNOx)=(0,0,65535)
ModifyGraph mode(fittedNOx)=2,lsize(fittedNOx)=2
```

Interpolate X, Y, Z waves as a 3D surface.

```
// Note: The next 3 Make commands are wrapped to fit on the page.
Make/O/D vels= {1769, 1711, 1538, 1456, 1608, 1574, 1565, 1692, 1538, 1505, 1764, 1723,
1540, 1441, 1428, 1584, 1552, 1690, 1673, 1548, 1485, 1526, 1536, 1591, 1671, 1647, 1608,
1562, 1740, 1753, 1590, 1466, 1409, 1429}
Make/O/D ews={8.46279, 3.46303, -1.51508, -6.51483, 16.597, -5.95541, -28.5078, 9.68438,
-6.00159, -21.7557, 14.263, 6.02058, -2.25772, -10.536, -18.7785, 10.7509, -6.07024,
1.77531, 0.767701, -0.235545, -1.24315, 21.7298, 10.3964, 0.133859, -10.1733, -20.4359,
13.7658, -8.88429, 10.8869, 4.91318, -0.0649319, -5.06469, -10.0428, -11.0601}
Make/O/D nss={-38.1732, -15.6207, 6.83407, 29.3865, 3.67947, -1.32028, -6.32004, -
10.3852, 6.43591, 23.3302, -37.1565, -15.6842, 5.88156, 27.4473, 48.9196, 10.0254, -
5.66059, -40.6613, -17.5832, 5.39486, 28.4729, 43.5833, 20.852, 0.26848, -20.4045, -
40.988, 3.0518, -1.9696, -49.1077, -22.1619, 0.292889, 22.8453, 45.3001, 49.8887}

// Evaluate the smoothed function as interpolated image
Make/O/N=(50,50) velsImage
WaveStats/Q ews
SetScale/I x, V_Min, V_Max, "" velsImage // destination factors
WaveStats/Q nss
SetScale/I y, V_Min, V_Max, "" velsImage // are X and Y scaling

Loess/DEST=velsImage/DFCT/NORM=0/SMTH=0.75/E/Z srcWave=vels, factors={ews,nss}
// Display source data as a contour with x, y markers.
Display; AppendXYZContour vels vs {ews,nss}
ModifyContour vels xymarkers=1, labels=0
ColorScale

// Display interpolated surface as an image
AppendImage velsImage
ModifyImage velsImage ctab= {*,*,Grays256,0}
ModifyGraph mirror=2
```

References

- Cleveland, W.S., Robust locally weighted regression and smoothing scatterplots, *J. Am. Stat. Assoc.*, 74, 829-836, 1979.
- Cleveland, W.S., E. Grosse, and M.-J. Shyu, A Package of C and Fortran Routines for Fitting Local Regression Models, Technical Report, Bell Labs, 54pp, 1992.
- NIST/SEMATECH, LOESS (aka LOWESS), in *NIST/SEMATECH e-Handbook of Statistical Methods*, <<http://www.itl.nist.gov/div898/handbook/pmd/section1/pmd144.htm>>, 2005.

See Also

Smooth, **Interpolate2**, **interp**, **MatrixFilter**, **MatrixConvolve**, and **ImageInterpolate**.

log

log(*num*)

The log function returns the log base 10 of *num*.

It returns -INF if *num* is 0, and returns NaN if *num* is less than 0.

To compute a logarithm base n use the formula:

$$\log_n(x) = \frac{\log(x)}{\log(n)}.$$

See Also

The **ln** function.