Subject: Re: Regression fit and random noise
Posted by Phillip Bitzer on Thu, 28 Mar 2013 21:51:36 GMT
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Not quite sure what you're asking here - we need a little more info. What routine are you using to do the fit? When you say noise/signal ratio, do you mean signal to noise ratio (SNR)? Do you have some sort of example data?

Regardless, consider the following "simple" linear regression, adapted from the IDL help:

```
PRO test_model

npts = 100
x = FINDGEN(npts)

noiseFactor = 0.

y = x + noiseFactor*(RANDOMU(seed, npts)-0.5)

plot, x, y, psym=2

result = REGRESS(X, Y, SIGMA=sigma, CONST=const, corr = r2, $
  MEASURE_ERRORS=measure_errors)

PRINT, 'Constant: ', const
PRINT, 'Coefficients: ', result[*]
PRINT, 'Standard errors: ', sigma
PRINT, 'Correl Coeff: ', r2

END
```

Notice as you increase the noise factor, the correlation coefficient gets worse. This is entirely expected and is not a IDL-only thing. Basically, the "signal" gets swamped out by the "noise". You should get your hands on a good statistics book (e.g., Data Reduction and Error Analysis in the Physical Sciences by Bevington, Statistical Methods in the Atmospheric Sciences by Wilks) to better interpet what's going on "under the hood". For instance, according to regress.pro, the fit is done via chi squared minimization.

Good luck!