Subject: Re: fitting many linear eqs simultaneously with outliers
Posted by Matt Francis on Fri, 14 Oct 2011 05:37:12 GMT

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I have had reasonable success with noisy outlier full data using AMOEBA (from IDL Astronomy User's Library) to minimise the following fitness function derived in "Data Analysis:A Bayesian Tutorial" (D.S. Sivia) section 8.3.1 (second edition):

$$F = \text{SUM\_i} \left\{ 1/(\sigma * \sqrt{2\pi}) * [(1 - \exp(-R\_i^2/2))/R\_i^2]\right\}$$

where $R\_i = (\text{model} - \text{measured})/\sigma$

and σ is your best a priori guess of the measurement error.

The fitness function above works remarkably well at toning down the influence of outliers. The down side is that this doesn't use the linearity of the equations at all, but AMOEBA works pretty efficiently and your parameter space probably won't be too multi-modal so a downhill solver should work fine.