Subject: fitting many linear eqs simultaneously with outliers
Posted by Jeremy Bailin on Thu, 13 Oct 2011 05:01:04 GMT
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So I have a large number of very simple linear equations, which all look like:

a_i + b_i x_ij = a_k + b_k x_kj

for i,k=1..N (all unique combinations of i and k), j=1..M. The data values x_ij and x_kj are measurements of the brightness of object j in images i and k respectively, where the images have an unknown zero point and scalings that I am trying to determine.

(aside to astronomers: this may sound suspiciously like re-implementing mscimatch)

Not all objects appear in all images, so there are different numbers of equations relating each pair of images. In principle, any number of linear solvers should work... BUT: it needs to be extremely robust to outliers. I know for a fact that there are many many many outliers, and there are some pairs of images where it looks like pure scatter. So I need some sort of solver that will do sigma clipping. Essentially, I want a sigma-clipping linear least squares solver that can solve more than one line at once.

Does anyone know of such a beast already existing? Or something that's vaguely similar enough that I can use it as a basis?

-Jeremy.