Subject: Re: SVDFIT Problems
Posted by James Kuyper on Thu, 05 Sep 2002 20:15:07 GMT
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Bill wrote:
>
> Chris Torrence wrote:
>
>> Hi Bill,
>>
>> Actually, the SVDFIT code *does* use THRESH = TOL*wmax. If you look
>> carefully at the IDL code, around line 249, there is the following line:
>>
>> small=WHERE(variance LE max(variance)*thresh, cc)
>>
>> (The variable name "thresh" was an unfortunate choice, and should really
>> have been "tol".)
>>
>> Internally, the C code is identical to the Numerical Recipes code, except
>> for the TOL value, which is 1e-9 for both single and double precision. We
>> could consider adding a TOL keyword to the SVDFIT function, which would
>> allow the user to change this default.
>>
>> Cheers,
>>
>> Chris
>> Research Systems, Inc.
>> <snip>
>
> Two comments:
>
> 1. Unless the double keyword is being ignored, TOL should not be the same for
> single and double precision. All computers IDL is currently available on use
> IEEE 754 math. In this standard the mantissa is represented by 23 bits in
> single precision and 52 bits in double precision. With 754's hidden bit,
> single precision has a relative precison of 1/2^24 ~ 6e-8 and double has a
> relative precision of 1/2^53 ~ 1e-16. SVD should identify as singular any
> value that is largely determined by the precision of the arithmetic. Such

True, but it should also identify as singular any value that is largely
determined by the precision of the input data. With double precision
floating point, the precision of the result is likely to be dominated by
the precision of the input data, not by the precision of the arithmetic.

That's why TOL shouldn't just slavishly depend upon the precision of the
data type. It's also why TOL should be adjustable by the user.