Subject: Re: machine precision
Posted by jameskuyper on Mon, 18 May 2009 13:33:48 GMT
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Wox wrote:
> Hi all,
>
> When checking whether two foating point variables are equal, one has
> to do this:
>
> pres = (machar()).eps
> bequal = abs(f1-f2) lt pres
>
> This can go wrong however, as illustrated by the example below. Do I
> need to do error propagation on this? This means that every time f1
> and f2 are calculated differently, I have to calculate a different
> uncertainty?

Yes.

> ... This seems like a lot of work, not to mention the machine
> precision in calculation the propagation of uncertainty... Is there a
> more general rule of thumb I can use?
>
> vec1=[1.,2,3,4,5]
> vec2=vec1
> pres=(machar()).eps
> norm1=sqrt(total(vec1^2,1,/pres))
> norm2=sqrt(total(vec2^2,1,/pres))
> f1=total(vec1*vec2,/pres) ; inner product
> f2=norm1*norm2 ; product of the norms
> ; f1 and f2 must be equal so

At a minimum, you should use pres*(f1^2+f2^2)^0.5 instead of pres for the following comparison. eps gives you the relative precision, not the absolute precision; it needs to be scaled by the numbers you're working with.

> if abs(f1-f2) ge pres then print,'wrong wrong wrong...'