Subject: ratio imaging
Posted by Dan Larson on Fri, 08 Mar 2002 16:31:14 GMT
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I am trying to do simple ratiometric
imaging with IDL. Of course, since
there is some pixelation noise, the
ratio is not very robust. I have
experimented with a number of
different filters (median, Gaussian
deconvolution, smooth) to try and
remove some of this instability.
Is there a filtering technique which
is minimally perturbative that will
remove some numerical artificats
without changing the boundaries of
objects?

Dan Larson
Cornell Univ.

Subject: Re: ratio imaging
Posted by Dan Larson on Tue, 12 Mar 2002 16:54:43 GMT
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In article <9fe17a3c.0203120028.1a7caf67@posting.google.com>,
gerhard.holst@pco.de says...
> Craig Markwardt <craigmnet@cow.physics.wisc.edu> wrote in message
news:<on1yev3r9q.fsf@cow.physics.wisc.edu>...
>> Dan Larson <drl16@cornell.edu> writes:
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>> Dan, you should be filtering the two images, *before* computing the
>> ratio, right? I would have said that goes without saying, but now I
>> am saying it. [The reason of course is that the ratio does not have

>> a nice compact statistical distribution, so averaging is less
>> robust.]
>>
>> Craig
>
> Dan,
> if your are looking for more edge preserving filters you might
> search for topics like "Savitzky-Golay" and "LOESS", both are
> filters that might consume a little more time in calculation
> (especially the LOESS I have found on the web, if you are interested
> I can look for the link), but they do a good job in smoothing
> while edge keeping, much better than boxcar, median etc.
>
> Gerhard
>
Gerhard,

I am familiar with the Savitzky-Golay filter, but I have never used the LOESS filter. If you have an implementation that you like, I would like to hear about it. Do you know what the acronym stands for?

Dan

Subject: Re: ratio imaging
Posted by the_cacc on Wed, 13 Mar 2002 11:03:53 GMT
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Yo,

My $0.02... be a bit wary about filtering, it won't do magic for you (obviously!). However it will do *something*. Be curious about what that is...

Consider you have N + n1 (numerator + noise) and D + n2 (denominator + noise) and you are forming (N+n1)/(D+n2). What you really want is N/D, right? Filtering will give you <N+n1>/<D+n2>, where <> implies some sort of filtering. Ideally, <N+n1>=N and <D+n2>=D but it won't ever in reality. If you have an analytical expression for what N and D are, you might be able to work out what's going on analystically. Otherwise do some simulations and check that the <N+n1>/<D+n2> you are forming is approximately the N/D you want. Choose you filter, if any, on this basis.

Ciao.

Subject: Re: ratio imaging
Posted by gerhard.holst on Wed, 13 Mar 2002 12:39:44 GMT
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>
> Dan

Hi Dan,

to my knowledge it stands for an old German geological term,
it is no acronym, there is also a filter called Lowess very similar to that.
I have found the origin of the LOESS routines in IDL that I use,
they were developed by H. Freudenreich.
http://www.astro.washington.edu/deutsch/idl/htmlhelp/slibrar y14.html
There is also the source for his routines based on a library from
AT&T Labs. I have attached 2 files (pdf&ps) that give some background
on the filter. If you use the Loess routine of Freudenreich, keep
the pixelwidth odd, otherwise you'll get error messages, if I remember
correct.

Gerhard