Subject: Gaussian Convolution
Posted by Thomas Edgar Nichols on Mon, 14 Nov 1994 05:24:11 GMT
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I have checked the FAQ and poked around the suggested FTP sites and have not come up with a
Gaussian Blur function (in 3D)
along the lines of smooth() which uses a uniform kernal instead of a Gaussian one.

I still can't believe that this isn't part of the standard library; I have tried smooth2(), which LOOKS fine, but it is only "approximately" Gaussian, which doesn't cut it (try writing a methodology section of a medical imaging paper saying you used "approximately" gaussian smoothing).

A valid respons would be: DIY! Yes, I am working on a function that uses Gaussint() to make a kernal to convolve with convol(), but I hate reiventing the wheel when I know someone else MUST have had this exact same need.

-Tom

Subject: Re: gaussian convolution
Posted by helaha on Fri, 23 Mar 2007 17:03:48 GMT
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Hello Tim,
If lower resolution means, that you want to reduce the number of wavelength bins, then I think interpolation (INTERPOLATE, REBIN, or CONGRID) is the way.
e.g.:
```
Spec = FLOATARR(100)            ;100 initial intensity values
Spec =.....             ; Set Spec with your values
Spec = CONGRID(Spec, 50, /INTERP);now the spectrum has only 50 wavelength bins
```

hope this helps,
helaha

On Mar 23, 4:00 pm, mikeinthe...@yahoo.com wrote:
> Hi there,
>
> I have a (theoretically computed) spectrum and I would like to degrade
> it to a lower resolution.
>

> I was wondering if there is any standard procedure to do it and/or
> some "pre-cooked" routine in IDL. Is there any gaussian filter
> routine?
>
> My first guess would be to use a gaussian filter in order to reduce
> the resolution. The spectrum is (intensity vs. wavelength),so I
> think 1D gaussian filter would be OK. Is there anyone with experience
> on it ?
>
> Suggestions are welcome, thanks! Cheers,
> Tim

Subject: Re: gaussian convolution
Posted by news.verizon.net on Sat, 24 Mar 2007 16:20:51 GMT
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> My first guess would be to use a gaussian filter in order to reduce
> the resolution. The spectrum is (intensity vs. wavelength),so I
> think 1D gaussian filter would be OK. Is there anyone with experience
> on it ?
>
There are several IDL procedures on the Web to convolve a spectrum
with a Gaussian; you might try gaussfold.pro at

http://astro.uni-tuebingen.de/software/idl/aitlib/misc/gauss fold.pro

which requires the procedure psf_gaussian.pro to create the kernel

http://idlastro.gsfc.nasa.gov/ftp/pro/image/psf_gaussian.pro

If your spectrum has 1 Angstrom resolution, and you want to degrade it
to 3 Angstrom resolution, you should convolve it with a Gaussian with
a FWHM of sqrt(3^2-1^2) = 2.82 Angstrom,e.g.

fsmooth = gaussfold(w,f,2.82)

(The wavelength vector and FWHM should have the same units.) --Wayne

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Subject: Re: gaussian convolution
Posted by Kaushal Sharma on Wed, 27 Sep 2017 10:37:21 GMT
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Dear Wayne,

Could you please explain the mathematics (or refer to some paper) behind convolving with a

Gaussian of sqrt(b^2-a^2) to change the resolution from a Angstrom to b Angstrom?

Thanks,

On Saturday, March 24, 2007 at 9:50:51 PM UTC+5:30, Wayne Landsman wrote:
>> My first guess would be to use a gaussian filter in order to reduce
>> the resolution. The spectrum is (intensity vs. wavelength),so I
>> think 1D gaussian filter would be OK. Is there anyone with experience
>> on it ?
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> There are several IDL procedures on the Web to convolve a spectrum
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>
> fsmooth = gaussfold(w,f,2.82)
>
> (The wavelength vector and FWHM should have the same units.) --Wayne

---

Subject: Re: gaussian convolution
Posted by wlandsman on Wed, 27 Sep 2017 17:15:43 GMT
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On Wednesday, September 27, 2017 at 6:37:23 AM UTC-4, KS1989 wrote:
> Dear Wayne,
>
> Could you please explain the mathematics (or refer to some paper) behind convolving with a Gaussian of sqrt(b^2-a^2) to change the resolution from a Angstrom to b Angstrom?

One place is in the "proof using convolutions" section of

https://en.wikipedia.org/wiki/Sum_of_normally_distributed_ra ndom_variables

--Wayne
