Subject: FFT OF A NON RECTANGULAR IMAGE
Posted by legall_alice on Tue, 28 Oct 2008 16:23:38 GMT
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Hi all:

How can we do a FFT on a 2D-function that defines a non-rectangular image?

Here is an example: the region of interest is an inclined ellipse. To be able to apply FFT(array,1), I created an array where all the pixels around the ellipse are set to the value zero. I would like to exclude from the FFT process the black area (zero value pixels) surrounding the ellipse.

Thank you a lot in advance for your help,

Alice Le Gall

Subject: Re: FFT OF A NON RECTANGULAR IMAGE
Posted by Kenneth P. Bowman on Tue, 28 Oct 2008 18:12:08 GMT
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In article
<4a2c3474-def0-48fc-8611-05635d75f05d@v39g2000pro.googlegroups.com>,
legall_alice@yahoo.fr wrote:

> Hi all:
>
> How can we do a FFT on a 2D-function that defines a non-rectangular
> image?
>
> Here is an example: the region of interest is an inclined ellipse. To
> be able to apply FFT(array,1), I created an array where all the pixels
> around the ellipse are set to the value zero. I would like to exclude
> from the FFT process the black area (zero value pixels) surrounding
> the ellipse.
>
>
> Thank you a lot in advance for your help,
>
> Alice Le Gall

By their nature, Fourier transforms are global.

Can you map the ellipse to a rectangle? (http://en.wikipedia.org/wiki/Conformal_map)

Ken Bowman

Subject: Re: FFT OF A NON RECTANGULAR IMAGE
Posted by R.G. Stockwell on Wed, 29 Oct 2008 01:35:11 GMT
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<pgrigis@gmail.com> wrote in message
news:a67d1bc7-604e-4d94-83c3-e2ff5d662a1c@p10g2000prf.google groups.com...
>
>
> R.G. Stockwell wrote:
>> <pgrigis@gmail.com> wrote in message
>> news:3cb784b7-dfed-4c87-a2ab-d775d1edec0e@f40g2000pri.google groups.com...
>>> Maybe you could do a (slow) FT instead of FFT?
>>>
>>> Ciao,
>>>
>>> Paolo
>>
>>
>> Not directly. DFT and FFT are the same, the difference is in how the
>> calculation is done.
>
> What I meant was, for every frequency vector (kx,ky),
> evaluate the Furier transform F(kx,ky) by computing
> the integral of the input function (or table of values)
> multiplied by the Fourier basis function of kx,ky over
> the elliptical domain....
> On second thought, this would be extremly slow...
>
> Ciao,
> Paolo

I stake my life (no wait, your life) on the fact that the final result would
be
identical, allowing for differences due to lost precision (FFT would be
superior in that respect).

Cheers,
bob

PS try it out, you can write a DFT in about 3 lines.

Subject: Re: FFT OF A NON RECTANGULAR IMAGE
Posted by legall_alice on Wed, 29 Oct 2008 03:56:08 GMT
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Many thanks for your answers.
The ellipse was just an example. I was thinking of doing FFT on areas
defines by polygons and that can contains holes (shapefiles created
with ArcGis).
For the ellipse,you are right, I mapped it to a rectangle and the
resulting FFT is fine.
Thanks again,
Alice

Subject: Re: FFT OF A NON RECTANGULAR IMAGE
Posted by pgrigis on Thu, 30 Oct 2008 15:10:22 GMT
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On Oct 28, 9:35 pm, "R.G. Stockwell" <notha...@noemail.com> wrote:
> <pgri...@gmail.com> wrote in message
>
> news:a67d1bc7-604e-4d94-83c3-e2ff5d662a1c@p10g2000prf.google groups.com...
>
>
>
>> R.G. Stockwell wrote:
>>> <pgri...@gmail.com> wrote in message
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> identical, allowing for differences due to lost precision (FFT would be
> superior in that respect).
>
> Cheers,
> bob
>
> PS try it out, you can write a DFT in about 3 lines.

You mean, by setting the value of the function
outside the support [i.e. ellipse or whatever]
to 0? Yes, I can see that in this case the Fourier
integral will be the same as if it were evaluated
only on the support (because integrating 0 over
any area will always give 0). So yes, I agree with
you, let's disregard my previous post.

Paolo
