Subject: Re: Butterworth Band-Pass Filter
Posted by David Fanning on Sun, 12 Dec 2010 04:37:57 GMT

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burton449 writes:

- > as mentionned in the topic, i want to do a Butterworth Band-Pass
- > Filter on a 9166 X 4600 pixels image.

- > The doc of butterworth.pro in the astrolib explain how to use the
- > script for a lowpass filter, but not for a band-pass and a high-pass.

>

> Have any idea how to do?

You need to read my new book. In the meantime, you can find an explanation here:

http://www.dfanning.com/ip_tips/freqfiltering.html

This describes a low-pass filter, but the equation for the high-pass filter is there, too. Just replace the low-pass filter with the high-pass version. :-)

Cheers.

David

--

David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: http://www.dfanning.com/
Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: Butterworth Band-Pass Filter
Posted by burton449 on Sun, 12 Dec 2010 16:29:32 GMT
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On Dec 11, 11:37 pm, David Fanning <n...@dfanning.com> wrote:

- > burton449 writes:
- >> as mentionned in the topic, i want to do a Butterworth Band-Pass
- >> Filter on a 9166 X 4600 pixels image.

>

- >> The doc of butterworth.pro in the astrolib explain how to use the
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  This describes a low-pass filter, but the equation for
> the high-pass filter is there, too. Just replace the
  low-pass filter with the high-pass version. :-)
>
 Cheers.
>
> David
> David Fanning, Ph.D.
> Fanning Software Consulting, Inc.
> Coyote's Guide to IDL Programming:http://www.dfanning.com/
> Sepore ma de ni thui. ("Perhaps thou speakest truth.")
Thank you again David for your help,
According to your documentation, a high-pass butterworth filter will
be defined like that:
 filter = 1 / [1 + C(Ro/R)^2n]
So in IDL, for a cuttoff of 15, and fregImage = FFT(image, -1), the
filter will be defined like that:
```

filter = $1.0 / (1.0d + (15.0/freqImage)^2)$

Subject: Re: Butterworth Band-Pass Filter
Posted by David Fanning on Sun, 12 Dec 2010 16:56:47 GMT
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burton449 writes:

Is it right?
Thanks again

Max

According to your documentation, a high-pass butterworth filter will
 be defined like that:
 filter = 1 / [1 + C(Ro/R)^2n]
 So in IDL, for a cuttoff of 15, and freqImage = FFT(image, -1), the
 filter will be defined like that:

```
> filter = 1.0 / ( 1.0d + (15.0/freqImage)^2 )
>
> ls it right?
```

No, what you are calling freqImage is called freqDomainImage in that example. What you want is something like this:

```
s = Size(image, /Dimensions)
filter = 1.0D / (1.0D + 15.0/Dist(s[0],s[1]))^2)
```

In other words, what you are calling "freqImage" in the filter is actually built with the DIST function, and is different from the freqDomainImage, which is defined like this:

```
freqDomainImage = FFT(image, -1)
```

Cheers,

David

--

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Subject: Re: Butterworth Band-Pass Filter
Posted by David Fanning on Sun, 12 Dec 2010 17:02:25 GMT
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burton449 writes:

```
> According to your documentation, a high-pass butterworth filter will
> be defined like that:
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>
> So in IDL, for a cuttoff of 15, and freqImage = FFT(image, -1), the
> filter will be defined like that:
> filter = 1.0 / (1.0d + (15.0/freqImage)^2)
> Is it right?
```

For what it's worth, I got confused by all this when I was reading this article, too, in preparation for

including this information in my new book. I think I explained it better in the book, and I'll probably go back and fix this article, too. But not now. I can see the end of this book from where I am standing and I am at the point where bathing is completely extraneous to my purpose! :-)

Cheers,

David

--

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Subject: Re: Butterworth Band-Pass Filter
Posted by burton449 on Sun, 12 Dec 2010 17:07:50 GMT
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```
On Dec 12, 12:02 pm, David Fanning <n...@dfanning.com> wrote:
> burton449 writes:
>> According to your documentation, a high-pass butterworth filter will
>> be defined like that:
     filter = 1 / [1 + C(Ro/R)^2n]
>> So in IDL, for a cuttoff of 15, and freqImage = FFT(image, -1), the
>> filter will be defined like that:
     filter = 1.0 / (1.0d + (15.0/fregImage)^2)
>>
>> Is it right?
>
> For what it's worth, I got confused by all this when
> I was reading this article, too, in preparation for
> including this information in my new book. I think I
> explained it better in the book, and I'll probably go
> back and fix this article, too. But not now. I can see
> the end of this book from where I am standing and I am
> at the point where bathing is completely extraneous to
 my purpose! :-)
>
> Cheers,
> David
```

- > --
- > David Fanning, Ph.D.
- > Fanning Software Consulting, Inc.
- > Coyote's Guide to IDL Programming:http://www.dfanning.com/
- > Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Is it possible to have a look at this book? :)

I dont think you can create a High-Pass filter the way you explain it like your last post or like you explain in the article because you have the division by 0 error when you put the Dist function in denominator... even in your example with dist(248) you have the same error...

Max

Subject: Re: Butterworth Band-Pass Filter
Posted by David Fanning on Sun, 12 Dec 2010 17:19:26 GMT
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burton449 writes:

- > I dont think you can create a High-Pass filter the way you explain it
- > like your last post or like you explain in the article because you
- > have the division by 0 error when you put the Dist function in
- > denominator... even in your example with dist(248) you have the same
- > error...

Oh, right. Good point. In the book I actually used a Gaussian high-pass filter, but it should have had the same problem. Humm. I'll have to look at that more closely. I certainly got nice looking output. I wonder why...:-(

Well, you could do something like this:

$$(Dist(s[0],s[1]) > 1e-6)$$

> Is it possible to have a look at this book? :)

Probably not. My little experiment to make draft chapters available was a dismal failure. Lots of people downloaded the chapters, but only one person sent me any comments. They were too embarrassed, I guess. :-(

I will be looking for people willing to read the book and help me find typos and these kind of errors, though. Probably after the first of the year. Would you be interested in that?

Cheers,

David

--

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Subject: Re: Butterworth Band-Pass Filter
Posted by David Fanning on Sun, 12 Dec 2010 17:24:23 GMT
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David Fanning writes:

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- > used a Gaussian high-pass filter, but it should
- > have had the same problem. Humm. I'll have to
- > look at that more closely. I certainly got
- > nice looking output. I wonder why...:-(

Oh, with the Gaussian high-pass filter, the DIST function is in the numerator, not the denominator. That's why it worked.

I've GOT to clean up around here before my middle son returns from Nepal, but maybe I'll have a chance to work through an example later today.

Cheers,

David

--

David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: http://www.dfanning.com/
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```
On Dec 12, 12:19 pm, David Fanning <n...@dfanning.com> wrote:
> burton449 writes:
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>
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>
>
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```

Of course that I am interested! The timing is perfect because I will have one or two months off after the first of the year, and I would like to spend some time learning more IDL. Im not expert but I can test your examples of some chapters if you like.

```
Subject: Re: Butterworth Band-Pass Filter
Posted by burton449 on Sun, 12 Dec 2010 17:30:06 GMT
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On Dec 12, 12:19 pm, David Fanning <n...@dfanning.com> wrote: > burton449 writes: >> I dont think you can create a High-Pass filter the way you explain it >> like your last post or like you explain in the article because you >> have the division by 0 error when you put the Dist function in >> denominator... even in your example with dist(248) you have the same >> error... > > Oh, right. Good point. In the book I actually > used a Gaussian high-pass filter, but it should > have had the same problem. Humm. I'll have to > look at that more closely. I certainly got > nice looking output. I wonder why... :-(Well, you could do something like this: > (Dist(s[0],s[1]) > 1e-6)> >> Is it possible to have a look at this book? :) > Probably not. My little experiment to make > draft chapters available was a dismal failure. > Lots of people downloaded the chapters, but > only one person sent me any comments. They were > too embarrassed, I guess. :-(> > I will be looking for people willing to read the > book and help me find typos and these kind of > errors, though. Probably after the first of the year. Would you be interested in that? > Cheers, > David > > David Fanning, Ph.D. > Fanning Software Consulting, Inc. > Coyote's Guide to IDL Programming:http://www.dfanning.com/ > Sepore ma de ni thui. ("Perhaps thou speakest truth.")

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