
Subject: Circular statistics in IDL

Posted by [Gadi Goelman](#) on Tue, 13 Dec 2016 09:20:13 GMT

[View Forum Message](#) <> [Reply to Message](#)

Does any one know if there is a circular statistics tool in IDL similar to the CircStat in Matlab? or any other tool to work with complex numbers

Thanks

Gadi

Subject: Re: Circular statistics in IDL

Posted by [Dick Jackson](#) on Tue, 13 Dec 2016 16:10:29 GMT

[View Forum Message](#) <> [Reply to Message](#)

On Tuesday, 13 December 2016 01:20:14 UTC-8, Gadi Goelman wrote:

> Does any one know if there is a circular statistics tool in IDL similar to the CircStat in Matlab? or any other tool to work with complex numbers

>

> Thanks

>

> Gadi

Hi Gadi,

I haven't seen an IDL library available, but when I needed some circular statistics (a.k.a. directional statistics) I wrote that up myself. What I did computed the mean, variance and standard deviation.

The CircStat library certainly is comprehensive:

<https://github.com/circstat/circstat-matlab>

How much of that functionality do you think you will need?

Cheers,

-Dick

Dick Jackson Software Consulting Inc.

Victoria, BC, Canada --- <http://www.d-jackson.com>

Subject: Re: Circular statistics in IDL

Posted by [Gadi Goelman](#) on Tue, 20 Dec 2016 16:05:01 GMT

[View Forum Message](#) <> [Reply to Message](#)

On Tuesday, December 13, 2016 at 6:10:30 PM UTC+2, Dick Jackson wrote:

> On Tuesday, 13 December 2016 01:20:14 UTC-8, Gadi Goelman wrote:
>> Does any one know if there is a circular statistics tool in IDL similar to the CircStat in Matlab?
or any other tool to work with complex numbers
>>
>> Thanks
>>
>> Gadi
>
> Hi Gadi,
>
> I haven't seen an IDL library available, but when I needed some circular statistics (a.k.a.
directional statistics) I wrote that up myself. What I did computed the mean, variance and standard
deviation.
>
> The CircStat library certainly is comprehensive:
> <https://github.com/circstat/circstat-matlab>
>
> How much of that functionality do you think you will need?
>
> Cheers,
> -Dick
>
> Dick Jackson Software Consulting Inc.
> Victoria, BC, Canada --- <http://www.d-jackson.com>

Thanks Dick

What I need is to calculate significance of complex numbers or phases. Do you know if correct
calculations of mean, variance etc is sufficient? I guess that you cant assume normal distributions
and different distributions are needed such circular Gaussian.

Best,

Gadi

Subject: Re: Circular statistics in IDL
Posted by [Craig Markwardt](#) on Wed, 21 Dec 2016 17:25:02 GMT
[View Forum Message](#) <> [Reply to Message](#)

On Tuesday, December 20, 2016 at 11:05:03 AM UTC-5, Gadi Goelman wrote:
> On Tuesday, December 13, 2016 at 6:10:30 PM UTC+2, Dick Jackson wrote:
>> On Tuesday, 13 December 2016 01:20:14 UTC-8, Gadi Goelman wrote:
>>> Does any one know if there is a circular statistics tool in IDL similar to the CircStat in Matlab?
or any other tool to work with complex numbers
>>>
>>> Thanks
>>>
>>> Gadi

>>
>> Hi Gadi,
>>
>> I haven't seen an IDL library available, but when I needed some circular statistics (a.k.a. directional statistics) I wrote that up myself. What I did computed the mean, variance and standard deviation.
>>
>> The CircStat library certainly is comprehensive:
>> <https://github.com/circstat/circstat-matlab>
>>
>> How much of that functionality do you think you will need?
>>
>> Cheers,
>> -Dick
>>
>> Dick Jackson Software Consulting Inc.
>> Victoria, BC, Canada --- <http://www.d-jackson.com>
>
> Thanks Dick
> What I need is to calculate significance of complex numbers or phases. Do you know if correct calculations of mean, variance etc is sufficient? I guess that you cant assume normal distributions and different distributions are needed such circular Gaussian.

I'm a big fan of the Rayleigh (Z) statistic. It's pretty easy to calculate. For an array of unit complex number U, it's

$Z = \text{total}(\text{abs}(U)^2)$

In the case of the null hypothesis (only noise), the Z statistic is distributed as a chi-square with 2 degrees of freedom. You you can use IDL's chi-square statistic to test statistical significance, or my equivalent MPCHITEST() function.

Craig

Subject: Re: Circular statistics in IDL
Posted by [Dick Jackson](#) on Fri, 30 Dec 2016 01:16:00 GMT
[View Forum Message](#) <> [Reply to Message](#)

On Wednesday, 21 December 2016 09:25:04 UTC-8, Craig Markwardt wrote:
> On Tuesday, December 20, 2016 at 11:05:03 AM UTC-5, Gadi Goelman wrote:

>> What I need is to calculate significance of complex numbers or phases. Do you know if correct calculations of mean, variance etc is sufficient? I guess that you cant assume normal distributions and different distributions are needed such circular Gaussian.
>
> I'm a big fan of the Rayleigh (Z) statistic. It's pretty easy to calculate. For an array of unit complex number U, it's

>
> Z = total(abs(U)^2)
>
> In the case of the null hypothesis (only noise), the Z statistic is distributed as a chi-square with 2 degrees of freedom. You can use IDL's chi-square statistic to test statistical significance, or my equivalent MPCHITEST() function.
>
> Craig

In general, I trust anything Craig says :-), and other sources point in the same direction:
https://en.wikipedia.org/wiki/Directional_statistics#Goodness_of_fit_and_significance_testing

Some MATLAB functions written for this seem to follow this:
https://github.com/circstat/circstat-matlab/blob/master/circ_r.m
https://github.com/circstat/circstat-matlab/blob/master/circ_rtest.m

I hope this is helpful!

Cheers,
-Dick

Dick Jackson Software Consulting Inc.
Victoria, BC, Canada --- <http://www.d-jackson.com>
