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Subject: Re: Can IDL calculate the confidence level about correlation

Posted by [wanglin1981](#) on Sat, 24 Nov 2007 01:30:26 GMT

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> On Nov 22, 7:51 pm, Lin Wang <wanglin1...@gmail.com> wrote:

>

>> I found a code which can calculate the confidence level using pvalue

>> method (see below). It works well, but usually I use the Student's t-

>> test method. So can anyone help?

>

>> Thanks!

>

>> r=correlate(x,y)

>> var=1/(n-3.0)

>> zvalue = 0.5\*log((1+r)/(1-r))/sqrt(var)

>> if (zvalue lt 0) then pvalue = 2\*(gauss\_pdf(zvalue)) \$

>> else pvalue = 2\*(1-gauss\_pdf(zvalue))

>

> I think THIS is the way to do it. The t-test is irrelevant.

Vince,

Yes, p-value test can test the significance of correlations, but t-test is also widely used in meteorological studies, even more popular than p-value test I think.

The probability density function for correlation coefficient r is:

$$f(r) = \frac{\Gamma((n-1)/2) (1-r^2)^{(n/2-2)}}{\sqrt{\pi} \Gamma((n-2)/2)}$$

Set  $r = t/\sqrt{n-2}/\sqrt{1+t^2/(n-2)}$ , and  $v = n-2$ , then

$$f(r)dr = (\text{after some transformation}) = \frac{1}{\sqrt{v\pi}} \frac{\Gamma((v+1)/2)}{\Gamma(v/2)} [(1+t^2/2)^{-(v+1)/2}] dt$$

this is the probability density function for t distribution, so the significance of r can be evaluated by the t-test.

Lin

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