Subject: Re: possible bug in a_correlate()
Posted by Chris[2] on Fri, 01 Aug 2003 15:29:43 GMT
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Hi Tim,

This is not a bug. In Jenkins & Watts (Spectral Analysis and its Applications), p. 182, they discuss both definitions of the autocorrelation function (one with the mean of all n, and the other with the mean over the first and last N-m values).

As they state, "the use of the estimate [using N-m] is not recommended on the grounds that, whereas it is a reasonable estimate of rho(k) when considered in isolation from other values of the acf [autocorrelation function], it is not a satisfactory estimate when a set of estimates r(1), r(2),...r(m) is required for the first m autocorrelations rho(1), rho(2),...rho(m)."

They go on to state, "The main disadvantage of [using N-m] is that two means are used for the mean correction and that these change with lag...the estimates are not positive definite...and may lead to curious behavior of the estimates of the spectrum..."

I will go ahead and put a comment to this effect in the a_correlate.pro code. Thanks for pointing this out.

-Chris
Research Systems, Inc.

"Tim Osborn" <t.osborn@uea.ac.uk> wrote in message
news:3641786c.0308010702.4ea9fc4b@posting.google.com...
> Dear all,
>
> another possible bug to check with you all [this one could be more
> major than the total() one reported earlier today]!
>
> IDL Version 5.4 (OSF alpha).
>
> IDL> x=findgen(50)+randomn(seed,50)
>
> IDL> print,correlate(x[0:48],x[1:49])
> % Compiled module: CORRELATE.
>   0.998140
>
> IDL> print,a_correlate(x,[1])
> % Compiled module: A_CORRELATE.
>   0.940559
>

> Shouldn't these two give the same answer? The first correlates
> elements 0-48 with 1-49, while the second computes the lag-1
> autocorrelation of the 50-element vector.
>
> A quick check through the IDL code for a_correlate() seems to indicate
> a possible source of the bug. The function Auto_Cov computes the mean
> over the full length of the vector, whereas I think it should compute
> the mean over each segment separately (0:nx-m-1) and (m:nx-1), where m
> is the lag.
>
> Have I got this right, and has anyone else noticed or corrected this?
>
> Cheers
>
> Tim
