Re: ci on radius

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- *From*: vontressms@xxxxxx
- *Date*: 14 Feb 2006 07:32:29 −0800

Ray,

Here is what I came up with. There are two cases. If the confidence ellipse on the bivariate mean contains the origin, then the LCI on the magnitude is zero and the UCI is the magnitude of the point on the confidence ellipse that is farthest from the origin. If the confidence ellipse does not contain the origin, then the LCI is the magnitude of the point on the confidence ellipse that is nearest the origin and the UCI is the magnitude of the point on the confidence ellipse that is farthest from the origin.

Confidence intervals for the angle of the vector of the centroid can also be constructed. If the confidence ellipse contains the origin, then the angle can be between 0 and 2 pi, so the CI is [0,2pi]. If the confidence ellipse does not contain the origin, then the confidence interval on the angle is constructed from the angles of the tangents of the ellipse to the origin.

Thanks.
Mark

vontressms@xxxxxx wrote:

> Ray Koopman wrote:
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> > vontressms@xxxxxx wrote:
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> > > Ray Koopman wrote:
> > > [...]
> > >
> > > > Would a true r of zero be equivalent to the
> > > > true centroid of the (x,y)
> > > > distribution being at the origin?
> > >
> > > yes. It would mean that all of the data would be centered
> > > close to the
> > > origin. Hotteling's T^2 may be an equivalent test that r=0. I

> > still
> > need a CI on r though.
> > Thanks.
>
> Let n = the sample size,
> m = the sample mean vector of (x,y),
> S = the sample covariance matrix of (x,y),
> u = the unknown true mean vector of (x,y).
> Then the 100c% confidence region for u is
> (u − m)' S^−1 (u − m) < F[2,n−2,c]*2(n−1)/(n(n−2)), where
> F[a,b,c] = the c'th quantile of the F−distribution with df = (a,b).

Thanks − I can take it from here.

> The extrema of this ellipse can be taken as bounding r.

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