

Re: Weighted sum of squared normals question

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Herman Rubin wrote:

> [...]

> *I doubt that this approximation is that good, especially in*

> *the tails. [...]*

A scaled F, that fits the first three moments, should be better in the tails than a scaled chi-square, that fits only the first two moments.

Let

$$S1 = a1 + a2 + \dots + aN ,$$

$$S2 = a1^2 + a2^2 + \dots + aN^2,$$

$$S3 = a1^3 + a2^3 + \dots + aN^3.$$

Then the constant of proportionality is

$$c = \frac{S1*(S1^2*S2 - 2*S2^2 + 4*S1*S3)}{S1^2*S2 - 4*S2^2 + 6*S1*S3},$$

and the degrees of freedom are

$$f1 = \frac{S1*(S1^2*S2 - 2*S2^2 + 4*S1*S3)}{2*S1*S2^2 - S1^2*S3 + 2*S2*S3}$$

and

$$f2 = 6 + \frac{S2*(S1^2 + 2*S2)}{S1*S3 - S2^2}.$$