Re: random numbers from a lognormal distribution

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On Tue, 01 Feb 2005 20:33:15 −0600, Ray Koopman wrote:
>Bob Wheeler wrote:
>> [...]
>> I think he is asking how to do it himself. If X is a standard
normal variate, then U=(log(X)−m)/s is lognormal with mean
exp(m)sqrt(w), where w=exp(s^2), and variance exp(2m)w(w−1).
>
>Shouldn't that be "If X is a standard normal variate then
U=exp(X*s+m) is lognormal ..."?

This confusion reminds me of a trick I figured out for working with the lognormal distribution...

I always had trouble working with the formulas for converting the mean and standard deviation from the normal distribution to the lognormal distribution, and vice versa, E(x)−−>E(lnx), V(x)−−>V(lnx) and so forth. One day it occurred to me that both distributions are completely characterized by 2 pieces of information, and that the mean and standard deviation aren't the only 2 pieces of information I could use. They're the traditional pieces of information, but they're not the only ones.

I discovered that the median and interquartile range are much easier to use, so that's what I use now.

The transformation functions exp(x) and ln(x) are non−decreasing functions, and for any non−decreasing function g(x), the percentiles of x and g(x) are easy to derive from each other. If x_p is the p−th percentile of the random variable x, then g(x_p) is the p−th percentile of the random variable g(x).

In particular, if m is the median of a normal distribution, then ln(m) is the median of the corresponding lognormal distribution. And if m is the median of a lognormal distribution, then exp(m) is the median of the corresponding normal distribution. The same goes for the 25−th and 75−th percentiles, and that allows me to calculate the interquartile ranges of both distributions fairly easily.

So now whenever I work with the lognormal distribution, I use the median and interquartile range as my 2 pieces of information instead of the mean and standard deviation. Try it. I like it much better.