Normal Distribution

EViews: seems to be accurate (relerr $<$ 1E-6) for probabilities as small as 1E-22. The inverse function returns a critical value accurate to at least 6 digits.

LIMDEP: seems to be accurate (relerr $<$ 1E-5) for probabilities as small as 1E-22. The inverse function returns critical values accurate to 6 digits for probabilities as small as 1E-5; for smaller probabilities it issues a warning and returns zero.

SHAZAM: seems to be accurate (relerr $<$ 1E-6) for probabilities as small as 1E-8. The inverse function returns a critical value accurate to at most four digits.

TSP: seems to be accurate (relerr $<$ 1E-6) for probabilities as small as 1E-22. The inverse returns a critical value accurate to at least six digits.

Student's-t Distribution, 100 d.f.

EViews: seems to be accurate (relerr $<$ 1E-6) for probabilities as small as 1E-16. The inverse function returns a critical value accurate to at least six digits.

LIMDEP: seems to be accurate (relerr $<$ 1E-5) for probabilities as small as 1E-15. The inverse function returns a critical value accurate to five digits for probabilities as small as 1E-10.

SHAZAM: seems to be accurate (relerr $<$ 1E-6) for probabilities as small as 1E-8. The inverse function returns a critical value accurate to no more than four digits.

TSP: seems to be accurate (relerr $<$ 1E-6) for probabilities as small as 1E-11. The inverse function returns a critical value accurate to at least six digits.

Chi-square Distribution with 100 d.f.

The chi-square distribution with k degrees of freedom is defined for $k > 0$. Some packages only accept integer values. If such a package is given a non-integer value for k, it should produce an error message rather than truncate

k to an integer and continue computing.

EViews: seems to be accurate (relerr less than 1E-6) for probabilities as small as 1E-31. The inverse function seems to be accurate to at least six digits. The program accepts non-integer degrees of freedom.

LIMDEP: seems to be accurate (relerr < 1E-6), for probabilities as small as 1E-31. The inverse function seems to be accurate to at least six digits. The program refuses to compute for non-integer degrees of freedom.

SHAZAM: For the BSP, the function seems accurate (relerr < 1E-6) and the inverse seems accurate to at least four digits. For the extreme tails, the function seems accurate (relerr < 1E-4) for probabilities as small as 1E-11, but the inverse function is accurate only for probabilities as small as 1E-5, beneath which it yields zero accurate digits. The program truncates non-integer degrees of freedom to an integer without issuing a warning,

TSP: The function seems accurate (relerr <1E-6) for the basic sequence of percentiles. The inverse is accurate to at least six digits for the lower tail, but is inaccurate in the upper tail. The inverse is exact for the 0.01 upper tail, but computes 154.7 for the upper 0.001 tail when the correct value is 149.4. Both the function and the inverse are inaccurate in the extreme tails. The program truncates a non-integer degrees of freedom to an integer without issuing a warning.

F-Distribution

This distribution is examined by seeing whether the function and its inverse return the basic sequence of percentiles for the parameters corresponding the outer-most rows and columns, and main diagonal of a standard F-distribution. In particular, the difference between the returned sequence and the original sequence is examined to see whether it is zero to several decimals. An exact test was performed for the same parameters with upper tail probability 0.01.

EViews: In every case the difference was zero to at least eight decimals. For the exact test, the function seems to be accurate (relerr $< 1E-6$) and critical values were correct to at least six digits.

LIMDEP: In every case the difference was zero to at least eight decimals. For the exact test, the function seems to be accurate (relerr $< 1E-6$) and critical values were correct to at least six digits.

SHAZAM: The difference was decidedly nonzero for most every case examined. Further examination suggested that the function itself appears to be accurate (relerr $< 1E-6$ in the exact test), but the inverse is extremely inaccurate. For example, the exact upper 1% tail of the F(3,3) is 29.46, but the inverse produces an estimated critical value of 36.8, which is not accurate to a single digit.

TSP: For moderate degrees of freedom, up to at least 120, the difference was zero to at least eight decimals. In the exact test, the function seems accurate (relerr $< 1E-6$) and the estimated critical values are accurate to at least six digits. However, TSP does not appear to handle large degrees of freedom. For example, the exact critical value for the upper 1% tail of F(9999,1) is 6365.55. Given this exact critical value, the function returns an upper tail of 0.062. Given 0.01, the inverse returns an estimated critical value of 0.695E+13.