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ANALYTICAL APPROXIMATIONS

Volume 20

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P-607

24 November 1954

Approved for OTS release

6p

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Analytical Approximation

Chi-Square Integral: To better than .0007 over
 $0 \leq x \leq \infty$ for $m = 6$,

$$F_m(m-2+x) = \frac{1}{2\Gamma(\frac{m}{2})} \int_0^{m-2+x} \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}} dt$$

$$\doteq 1 - \frac{.6767}{[1+.05094x+.005309x^2+.000145x^3]^4}.$$

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Analytical Approximation

Chi-Square Integral: To better than .0006 over
 $0 \leq x \leq 8$ for $m = 10$,

$$F_m(x) = \frac{1}{2\Gamma(\frac{m}{2})} \int_0^x \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}} dt$$

$$\doteq .00019638x^5 - .000056669x^6 + .0000060211x^7 \\ - .00000022862x^8.$$

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11-3-54

Analytical Approximation

Chi-Square Integral: To better than .0012 over

$0 \leq x \leq \infty$ for $m = 3$,

$$F_m(m-2+x) = \frac{1}{2\Gamma(\frac{m}{2})} \int_0^{m-2+x} \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}} dt$$

$$\approx 1 - \frac{.8012}{\left[1 + .0778x + .009774x^2 + .00005993x^3\right]^4}.$$

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Analytical Approximation

Chi-Square Integral: To better than .0009 over
 $0 \leq x \leq \infty$ for $m = 4$,

$$F_m(m-2+x) = \frac{1}{2\Gamma\left(\frac{m}{2}\right)} \int_0^{m-2+x} \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}} dt$$

$$\doteq 1 - \frac{.7358}{\left[1 + .06399x + .007689x^2 + .0001227x^3\right]^4}.$$

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Analytical Approximation

Chi-Square Integral: To better than .000% over

$0 \leq x < \infty$ for $m = 5$,

$$F_m(m-2+x) = \frac{1}{2^{\Gamma(\frac{m}{2})}} \int_0^{m-2+x} \left(\frac{t}{2}\right)^{\frac{m-1}{2}} e^{-\frac{t}{2}} dt$$

$$\doteq 1 - \frac{.7000}{\left[1 + .05619x + .006286x^2 + .0001423x^3\right]^4}.$$

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