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ANALYTICAL APPROXIMATIONS

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Analytical Approximation

Chi-Square Integral: To better than .0002 over

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

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

$$\approx 1 - \frac{.3916}{[1 + .09901x + .006958x^2 + .0003243x^3]^4}$$

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Analytical Approximation

Chi-Square Integral: To better than .00025 over
 $0 \leq x \leq \infty$ for $m = 4$.

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

$$\approx 1 - \frac{.4060}{\left[1 + .08399x + .006132x^2 + .0002676x^3\right]^4}$$

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Analytical Approximation

Chi-Square Integral: To better than .00025 over

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

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

$$\approx 1 - \frac{.4159}{\left[1 + .07406x + .005375x^2 + .0002350x^3\right]^4}$$

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Analytical Approximation

Chi-Square Integral: To better than .0003 over
 $0 \leq x \leq \infty$ for $m = 6$.

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

$$\approx 1 - \frac{.4232}{\left[1 + .06683x + .004779x^2 + .0002064x^3\right]^4}$$

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Analytical Approximation

Chi-Square Integral: To better than .0003 over
 $0 \leq x \leq \infty$ for $m = 7$,

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

$$\doteq 1 - \frac{.4289}{\left[1 + .06133x + .00429x^2 + .000187x^3\right]^4}$$

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