ANALYTICAL APPROXIMATION

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Analytical Approximation

Chi-Square Integral: To better than .00009 over $0 \leq x \leq 2$ for $m = 4$,

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

$$\doteq .12326x^2 - .037404x^3 + .0044021x^4.$$

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Analytical Approximation

Chi-Square Integral: To better than .00035 over $0 \leq x \leq 3$ for $m = 5$,

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

$$\doteq .05065x^{5/2} - .01496x^{7/2} + .001497x^{9/2}.$$

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Analytical Approximation

Chi-Square Integral: To better than .00014 over

$0 \leq x \leq 5$ for $m = 7$,

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

$$\doteq .0071720x^{7/2} - .0024020x^{9/2} + .00032986x^{11/2} - .000017534x^{13/2}.$$

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Analytical Approximation

Chi-Square Integral: To better than .00025 over $0 \leq x \leq 6$ for $m = 8$,

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

$$\doteq .0023355x^4 - .00075263x^5 + .000095032x^6 - .0000044847x^7.$$

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Analytical Approximation

Chi-Square Integral: To better than .0004 over

$0 \le x \le 7$ for $m = 9$,

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

$$\doteq .00070153x^{9/2} - .00021433x^{11/2} + .000024751x^{13/2} - .0000010405x^{15/2}.$$

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