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Analytical Approximations

Volume 8

Cecil Hastings, Jr.
James P. Wong, Jr.

P-376

2 March 1953

The RAND Corporation
1700 MAIN ST. • SANTA MONICA • CALIFORNIA

1-20-53

Analytical Approximation

Bessel Function of Imaginary Argument: To better than .0005 over $(1,\infty)$,

$$e^{-x}I_1(x) \doteq \frac{x}{\sqrt{5.3+7.7x+3.9x^2+2\pi x^3}} .$$

Cecil Hastings, Jr.
James P. Wong, Jr.
RAND Corporation

Analytical Approximation

Bessel Function of Imaginary Argument: To better than .00006 over $(2,\infty)$,

$$e^{-x}I_1(x) \doteq \frac{x}{\sqrt{10.69 + 3.32x + 4.68x^2 + 2\pi x^3}}.$$

Cecil Hastings, Jr.
James P. Wong, Jr.
RAND Corporation

1-28-53

Analytical Approximation

Bessel Function of Imaginary Argument: To better than .000,008 over $(4,\infty)$,

$$e^{-x}I_1(x) \doteq \frac{x}{\sqrt{10.86 + 2.82x + 4.78x^2 + 2\pi x^3}} .$$

Cecil Hastings, Jr.
James P. Wong, Jr.
RAND Corporation

2-4-53

Analytical Approximation

Bessel Function of Imaginary Argument: To better than .0006 over $(0,\infty)$,

$$e^{-x}I_0(x) \doteq \sqrt{\frac{1 + .297x + .341x^2}{1 + 2.333x + 2.137x^2 + 2.096x^3}} .$$

Cecil Hastings, Jr.
James P. Wong, Jr.
RAND Corporation

2-26-53

Analytical Approximation

Bessel Function of Imaginary Argument: To better than .00016 over $(2,\infty)$,

$$e^{-x}I_0(x) \doteq \frac{1}{\sqrt{2\pi x}}\left\{1 + \frac{.120}{x} + \frac{.136}{x^2}\right\}.$$

Cecil Hastings, Jr.
James P. Wong, Jr.
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