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Analytical Approximations

Volume 9

Cecil Hastings, Jr.

James P. Wong, Jr.

P-387

1 April 1953

The RAND Corporation
SANTA MONICA · CALIFORNIA

2-27-53

Analytical Approximation

Bessel Function of Imaginary Argument: To better than .0015 over $(2,\infty)$,

$$e^{-x}I_0(x) \doteq \frac{1}{\sqrt{2\pi x}}\left\{1 + \frac{.18}{x}\right\}.$$

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

3-13-53

Analytical Approximation

Bessel Function of Imaginary Argument: To better than .0001 over $(2, \infty)$,

$$e^{-x}I_0(x) \doteq \frac{1}{\sqrt{2\pi x}}\left\{1 + \frac{.107}{x} + \frac{.204}{x^2} - \frac{.085}{x^3}\right\}.$$

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James P. Wong, Jr.
RAND Corporation

3-16-53

Analytical Approximation

Bessel Function of Imaginary Argument: To better than .00022 over $(4,\infty)$,

$$e^{-x}I_0(x) \doteq \frac{1}{\sqrt{2\pi x}}\left\{1 + .\frac{147}{x}\right\}.$$

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James P. Wong, Jr.
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3-17-53

Analytical Approximation

Bessel Function of Imaginary Argument: To better than .00002 over $(4, \infty)$,

$$e^{-x}I_0(x) \doteq \frac{1}{\sqrt{2\pi x}}\left\{1 + \frac{.1188}{x} + \frac{.1273}{x^2}\right\}.$$

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

3-26-53

Analytical Approximation

Bessel Function of Imaginary Argument: To better than .0004 over (0,1),

$$e^{-x}I_0(x) \doteq \frac{1 + 1.42x}{1 + 2.406x + 1.794x^2} .$$

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