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Analytical Approximation

Bessel Function of Imaginary Argument: To better than .00007 over (0,2),

\[ e^{-x\sqrt{1}}(x) = \frac{.4981x + .0066x^2}{1 + .9805x + .4477x^2} \]

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James P. Wong, Jr.
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Analytical Approximation

Beznel Function of Imaginary Argument: To better than .000,006 over (0,1),

\[ e^{-xI_1(x)} = \frac{.45974x - .01695x^2}{1 + .95935x + .36282x^2} \]

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Analytical Approximation

Bessel Function of Imaginary Argument: To better than .0005 over \((0,\infty)\),

\[ e^{-xI_1(x)} \approx \frac{x}{\sqrt{3.78 + 9.81x + 3.09x^2 + 6.36x^3}} \]

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Analytical Approximation

Mach Number in Terms of Pressure Ratio: To .001 over 
.3 ≤ M ≤ 1.0 the inverse of

\[ x = \frac{P}{P_a} = \left[ 1 + \left( \frac{\gamma - 1}{2} \right) M^2 \right]^{\frac{-\gamma}{\gamma - 1}} \]

where \( \gamma = 1.4 \), is given by

\[ M = \frac{2.714 - 2.625x}{1 + 1.650x - 1.955x^2} \]

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Analytical Approximation

Bessel Function of Imaginary Argument: To better
than .00005 over $(2, \infty)$,

$$e^{-xI_1(x)} = \frac{x}{\sqrt{10.791 + 3.757x + 4.541x^2 + 6.796x^3}}$$

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