Numerical Methods for Engineers | (5th Edition)

Chapter 3, Problem 7P | Bookmark | Show all steps: ON

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Step 1 of 2

Consider the polynomial:

$$y = x^3 - 7x^2 + 8x - 0.35$$

Put the value of $x = 1.37$ in the equation:

$$\begin{aligned} y &= 1.37^3 - 7\times 1.37^2 + 8\times 1.37 - 0.35 \\ &= 2.571353 - 7\times 1.8769 + 8\times 1.37 - 0.35 \\ &= 0.043053 \end{aligned}$$

Apply 3-digit Chopping:

$$\begin{aligned} &= 2.57 - 7\times 1.87 + 8\times 1.37 - 0.35 \\ &= 2.57 - 13.0 + 10.9 - 0.35 \\ &= 0.12 \end{aligned}$$

Calculate the percent relative error as following:

$$\frac{0.043053 - 0.12}{0.043053}\times 100\% = 178.7\%$$

Hence, the percent relative error is $\boxed{178.7\%}$.

Comments (1)

Step 2 of 2

Consider the function:

$$y = ((x-7)x+8)x - 0.35$$

Put the value of $x = 1.37$ in the equation

$$\begin{aligned} y &= ((1.37-7)1.37+8)1.37 - 0.35 \\ &= (-7.7131+8)1.37 - 0.35 \\ &= (0.2869)1.37 - 0.35 \\ &= 0.043053 \end{aligned}$$

Calculate the function with 3 digit chopping

$$\begin{aligned} &= ((1.37-7)1.37+8)1.37 - 0.35 \\ &= (-7.71+8)1.37 - 0.35 \\ &= 0.047 \end{aligned}$$

Calculate the percent relative error as following

$$\begin{aligned} &= \frac{0.043053 - 0.047}{0.043053}\times 100\% \\ &= 9.2\% \end{aligned}$$

Hence, the percent relative error is $\boxed{9.2\%}$. The error is reduced by great extent.

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$$K = \frac{c_c}{c_a^2 c_b}$$

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Chapter 25, Solution 27P

Consider the following equation for the definite integral, This is identical to the solution for the differential equation...

$$I = \int_a^b f(x)\,dx$$

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