Assignment 5

Due on 2020-03-04, 23:48 IST.

Problem 1: Newton-Raphson in Single Variable

Consider the following equation to solve:

\[ f(x) = x^3 - 2x^2 + 3x - 1 = 0 \]

where \( a = 0 \) and \( b = 6 \). Set \( x_0 = 1.5 \) and \( e = 0.00001 \). Set the initial value for \( x_1 \) = 1.3. Note that \( f(x) \) is non-convex.

Please solve using a suitable method for the above problem using Newton-Raphson method:

1. Write down the initial value of \( x_1 \).
2. Explain the convergence steps.
3. What is the value of \( x_n \) after three iterations?

No, the answer is incorrect.

Accepted Answer: (Type Range: 0.000003206)

0.0 points

Problem 2: Multi-Variable fsolve

Solve the following set of equations in two variables:

\[ \begin{align*}
 2x + 3y &= 10 \\
 3x - 2y &= 5
\end{align*} \]

50% of all and using little hints of [1/2, 1], please solve above the above equations using fsolve.

3. Please report the final values of \( x \) and \( y \) for this problem.

No, the answer is incorrect.

Accepted Answer: (Type Range: -1.13008506)

0.0 points

Problem 3: Fixed-Point Iteration for Volume of Gas

For the fixed-point iteration, the fixed-point method rapidly converges to specific volume of non-ideal gas. For this problem, we will retain the specific volume of the gas \( k \). \( r = 10 \). 

1. What is the initial guess \( x_0 \) for \( x_0 \)?
2. Use the fixed point iteration with the following expression:

\[ x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)} \]

and report the values obtained with 20 iterations of the fixed-point iteration method.

No, the answer is incorrect.

Accepted Answer: (Type Range: -0.31924311)

0.0 points

Problem 4: Velocity of a Rocket

A full-time velocity rocket is supplied. This file to use this file for the problem. Please start writing only after the line "This file.

The specific impulse of a rocket is defined by the following formula:

\[ I = \frac{m_0}{m_f} \]

where \( I \) is the specific impulse in K and \( m_0 \) is the initial mass of fuel on board the rocket, \( m_f \) is the fuel consumption rate per second, \( g = 9.8 \) m/s², and \( m \) is the gravitational acceleration.

1. Compute the time-variant rocket maximum velocity of 0.509 in using the formula. 

No, the answer is incorrect.

Accepted Answer: (Type Range: 0.00007393)

0.0 points