

Subject: Engineering Mathematics

DPP-02

Chapter: Numerical Methods

Topic : Numerical Solution of Algebraic & Transcendental equations

- In the interval $[0, \pi]$ the equation $x = \cos x$ has
 - No solution
 - Exactly one solution
 - Exactly Two solution
 - An infinite number of solution
- The Newton-Raphson method is used to find the root of the equation $x^2 - 2$. If the iterations are started from -1 , then the iteration will-
 - converge to -1
 - converge to $\sqrt{2}$
 - converge to $-\sqrt{2}$
 - not converge
- The equation $x^3 - x^2 + 4x - 4 = 0$ is to be solved using the Newton-Raphson method. If $x = 2$ is taken as the initial approximation of the solution, the next approximation using this method will be-
 - $\frac{2}{3}$
 - $\frac{4}{3}$
 - 1
 - $\frac{3}{2}$
- Consider the series $X_{n+1} = \frac{x_n}{2} + \frac{9}{8x_n}$, $x_0 = 0.5$ obtained from the Newton-Raphson method. The series converges to-
 - 1.5
 - $\sqrt{2}$
 - 1.6
 - 1.4
- Equation $e^x - 1 = 0$ is required to be solved using Newton's method with an initial guess $x_0 = -1$. Then, after one step of Newton's method, estimate x_1 of the solution will be given by
 - 0.71828
 - 0.36784
 - 0.20587
 - 0.00000
- The real root of the equation $xe^x = 2$ is evaluated using Newton-Raphson's method. If the first approximation of the value of x is 0.8676, the 2nd approximation of the value of x correct to three decimal places is-
 - 0.865
 - 0.853
 - 0.849
 - 0.838
- The square root of a number N is to be obtained by applying the Newton-Raphson iterations to the equation $X^2 - N = 0$. If i denotes the iteration index the correct iterative scheme will be-
 - $X_{i+1} = \frac{1}{2} \left(X_i + \frac{N}{X_i} \right)$
 - $X_{i+1} = \frac{1}{2} \left(X_i^2 + \frac{N}{X_i^2} \right)$
 - $X_{i+1} = \frac{1}{2} \left(X_i^2 + \frac{N^2}{X_i} \right)$
 - $X_{i+1} = \frac{1}{2} \left(X_i - \frac{N}{X_i} \right)$
- How many distinct values of x satisfy the equation $\sin(x) = x/2$, where x is in radians?
 - 1
 - 2
 - 3
 - 4 or more
- Only one of the real roots of $f(x) = x^6 - x - 1$ lies in the interval $1 \leq x \leq 2$ and bisection method is used to find its value. For achieving an accuracy of 0.001, the required minimum number of iterations is_____.
- What is value of $(1525)^{0.2}$ to 2 decimal places?
 - 4.33
 - 4.36
 - 4.38
 - 4.30

Answer Key

- | | |
|--------|---------|
| 1. (b) | 6. (b) |
| 2. (c) | 7. (a) |
| 3. (b) | 8. (c) |
| 4. (a) | 9. (10) |
| 5. (a) | 10. (a) |



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