

Assignment – 1

Errors, Taylor Series, Root Finding

1. Find the Taylor series expansion of e^{-x} and hence find the value of e^{-4} , correct up to 4 decimal places.
2. Find the value of $\ln(1.09)$ numerically. Use Taylor series to find it.
3. $f(x) = \frac{2}{(1-x^3)}$. Find the value of $f'(0.39)$ numerically using forward, backward and centred approximation methods of first order. Compare the three values with the original one.
4. $f(x) = \frac{1-x}{(1+x)}$. Find the value of $f''(0.5)$ numerically using forward, backward and centred approximation of first order. Compare the three values with the original one.
5. Use the fixed point iteration $x = \frac{x+a/x}{2}$, to find square root of 2.37.
6. $P(x) = x^2 - x - 3/4$. Find the real roots of the polynomial $P(x)$. Use Bisection Method.
7. $P(x) = x^3 - 9x^2 + 15x + 25$. Find real roots of the polynomial. Use appropriate method(s) for it.