

Numerical Methods

Exercises

- Find the interpolated value at $x = 2$ using Lagrange interpolation of the following support points:
 - $(-4, 1)$ and $(3, 2)$
 - $(-2, -2)$, $(3, -4\frac{1}{2})$, and $(1, -\frac{1}{2})$
- Using the regula falsi, approximate the root of $f(x) = x^3 - x^2 + 2$ using the initial interval $[-2, 2]$.
- Using Picard iteration approximate the root of $f(x) = x + \cos x$. Start with $x_0 = 0$.
- Using the Newton-Raphson method approximate the root of $f(x) = x + \cos x$. Start with $x_0 = 0$.
- Using the Newton-Raphson method, find the approximation of the root of the function:
 - $f(x) = \sin(x) - \cos(x)$
 - $f(x) = x - e^{-x}$
- Using the first three iterations of the Newton-Raphson method, approximate $\sqrt[3]{2}$. Start with the approximation $\sqrt[3]{2} \approx 2$