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Q3) Solve exercises 4 and 5 of section 2.3.

4) Let f(x) =$-x^3$ –cosx. With p0 =–1 and p1 =0, find p3.

a) Use the Secant method. b) Use the method of False Position.

SOLUTION:

a)

$$p_{n=P_{(n-1)}-\frac{f(P_{(n-1)})(P_{(n-1)}-P_{(n-2)}}{f(p_{(n-1)}-f(p_{(n-2)})}}$$

$$p(2) = 0 - \frac{f(0)(0+1)}{f(0)-f(-1)} = \frac{\cos 0}{-\cos 0-(-(-1)^3-\cos(-1))} = -0.6851$$

$$p(3) = p(2) - \frac{f(p2)(p2-p1)}{f(p2)-f(p1)}$$

$$= -0.6851 - \frac{f(-0.6851)(-0.6851-0)}{f(-0.6851)-f(0)}$$

$$= -1.252$$

b) $p3 = p2 - \frac{f(p2)(p2-p0)}{f(p2)-f(p0)}$

$$p3 = \frac{1}{\cos(-1)-2} - \frac{f(-0.6851)(-0.6851-0)}{f(-0.6851)-f(0)}$$

$$p3 = -0.841355$$

5) Use Newton's method to find solutions accurate to within 10^{-4} for the following problems.

a. $x^3 - 2 * x^2 - 5 = 0$ **[1,4]** **b.** $x^3 + 3 * x^2 + 1 = 0$ **[−3,−2]**

c. x−cosx =0, [0,π/2] **d. x−0.8−0.2*sinx =0, [0,π/2]**

SOLUTION:

$$Pn = P(n-1) - \frac{f(P(n-1))}{f'(P(n-1))}$$

a.

$f'(x) = 3 * x^2 - 2 * x$ $p0 = 3$ £=10^{-2}

$p1 = 3 - \frac{4}{21} = 2.80952$ $|p1 - p0| = 0.1904 > 10^{-2}$

$p2 = 2.80952 - \frac{11.365}{18.0611} = 2.18026$ $|p2 - p1| = 0.6292 > 10^{-2}$

$p3 = 2.18026 - \frac{-4.14}{9.9000} = 2.59844$

$|p3 - p2| = 0.411818 > 10^{-2}$

$p4 = 2.59844 - \frac{-0.9593}{15.0587} = 2.66214$

$|p4 - p3| = 0.0637 > 10^{-2}$

$p5 = 2.66214 - \frac{0.0307}{15.93} = 2.6602$

$|p5 - p4| = 0.00194 < 10^{-2}$

5.Adımda kökümüzü bulduk, 2.6602