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Practical 4

Regula Falsi Method

AIM :- To perform the iterations of Regula Falsi Method for the functions within absolute convergence of 10^{-12}

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In[1]:= RegulaFalsi[a0_, b0_, m_] := Module[{}, a = N[a0]; b = N[b0];  
  If[f[a] x f[b] > 0, Print["Interval is not correct"]; Break[],  
  c = (a x f[b] - b x f[a]) / (f[b] - f[a]);  
  k = 0;  
  While[(k < m && Abs[f[c]] > 10^(-12)),  
    If[Sign[f[b]] == Sign[f[c]], b = c, a = c];  
    c = (a x f[b] - b x f[a]) / (f[b] - f[a]);  
    k = k + 1];  
  Print["the result after ", k, " iterations= ", NumberForm[c, 16]]  
  Print "f c =", NumberForm[f c, 16]; ;
```

(i) $f[x] = x^3 + 2x^2 - 3x - 1$ on the interval [1,2]

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In[2]:= f[x_] := x^3 + 2 x x^2 - 3 x x - 1  
RegulaFalsi 1, 2, 50  
  
the result after 35 iterations= 1.19869124351587  
  
f c = -7.780442956573097 x 10-13
```

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In[4]:= Clear f, x
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(ii) $f[x] = x^3 + 2x - 1$ on the interval [0,1]

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In[5]:= f[x_] := x^3 + 2 x x - 1  
RegulaFalsi 0, 1, 30  
  
the result after 22 iterations= 0.4533976515162839  
  
f c = -3.137490267590692 x 10-13
```

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In[7]:= Clear f, x
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(iii) $f[x] = \text{Exp}[-x] - x$ on the interval [0,1]

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[ ] [ ]
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In[8]: f x_ := Exp - x - x
      RegulaFalsi 0, 1, 30
      the result after 12 iterations= 0.5671432904099458
      f c =-2.537969834293108 x 10-13
```