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Practical I

Bisection Method With Condition Of Convergence

AIM :- To perform the iteration of bisection method for the functions within an absolute convergence (error tolerance) of 10^{-7}

```
In[1]:= Bisection[a0_, b0_, m_] := Module[{a = N[a0], b = N[b0]}, c = (a + b) / 2;  
      k = 0;  
      While[k < m && ((b - a) / 2) > 10^(-7), If[Sign[f[b]] != Sign[f[c]], b = c, a = c];  
      c = (a + b) / 2;  
      k = k + 1;];  
      Print["c=", NumberForm[c, 16]];  
      Print "f c =", NumberForm[f c, 16] ; ;
```

(i) $f_1[x] = x^3 + 2x^2 - 3x - 1$ on the interval [1,2]

```
In[2]:= f[x_] := x^3 + 2 x x^2 - 3 x x - 1  
      Bisection 1, 2, 30  
      c=1.198691189289093  
      f c =-3.310740535056311 x 10^-7  
In[4]:= Clear f, x
```

(ii) $f_2[x] = x^3 + 2x^2 - 3x - 3$ on the interval [1,2]

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In[5]:= f[x_] := x^3 + 2 x x^2 - 3 x x - 3  
      Bisection 1, 2, 30  
      c=1.460504829883575  
      f c =-3.708990110595778 x 10^-7  
In[7]:= Clear f, x
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(iii) $f(x) = \sin(x)$ on the interval $[3,4]$

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In[8]:= f[x_] := Sin[x]  
        Bisection 3, 4, 20
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c=3.141592502593994
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f c =1.50995799097837 x 10-7
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In[10]:= Clear f, x
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