

## **False position method of finding roots.**

(Please follow the book Numerical analysis by S.S. Sastry for theory)

! FALSE POSITION METHOD OR METHOD OF REGULA FALSI

```
dimension a(100)
real x(10000), f(10000), xa(20), xb(20)
real xx, fx, fa, fb
integer m,k
```

```
write(*,*) 'enter the order of the polynomial'
read(*,*) n
write(*,*) 'enter the co-efficient'
do i=1, n+1
read(*,*) a(i)
```

! write(\*,\*) a(i)  
enddo

```
h=0.07
x(1)=-3
do i=1,100
```

! call cal(n,a,x(i),f(i))  
x(i+1)=x(i)+h  
write(\*,\*) x(i),f(i)  
enddo

```
k=1
do i=1,100
if((f(i).gt.0.).and.(f(i+1).lt.0.)) then
xa(k)=x(i)
xb(k)=x(i+1)
```

```
write(*,*) xa(k),xb(k),k
k=k+1
elseif((f(i).lt.0.).and.(f(i+1).gt.0.)) then
xa(k)=x(i)
xb(k)=x(i+1)
```

```
write(*,*) xa(k),xb(k),k
k=k+1
endif
enddo
m=k-1
```

! write(\*,\*) 'the number of roots between',x(1),' and',x(100),' is',m  
.....

```
call cal(n,a,xa(1),fa)
call cal(n,a,xb(1),fb)
```

```
do k=1,m
```

```
20  xx=(xa(k)*fb - xb(k)*fa)/(fb-fa)
```

```
call cal(n,a,xa(k),fa)
call cal(n,a,xb(k),fb)
call cal(n,a,xx,fx)
```

```
if(abs(fx).lt.0.0001) goto 30
if((fx*fa).lt.0.0) then
  xb(k)=xx
  goto 20
```

```
elseif(fx*fb.lt.0.0) then
  xa(k)=xx
  goto 20
endif
```

```
30  write(*,*) "the",k," root is", xx
enddo
```

```
!  .....
stop
end
!  .....
```

```
subroutine cal(n,a,x,fx)
real a(n+1), x, fx, sum
```

```
sum=0
do i=1,n+1
sum=sum+a(i)*x**(n-i+1)
```

```
enddo
```

```
fx=sum
```

```
return
end
```

## output

```
enter the order of the polynomial
2
enter the co-efficient
1
1
-2
-2.020001    -1.950001        1
0.9899997    1.060000        2
the number of roots between -3.000000    and    3.929999    is    2
the    1 root is -2.000002
the    2 root is 0.9999850
```

Note: Since there are two roots between -3 and 4, we divide the interval into number of values and test for which two consecutive intervals the function changes its sign and that consecutive intervals is taken as guess values. However this is not the appropriate way to give the guess values. The user may change the programme accordingly on their basis of understanding.