Serial No. 1 Notes Date 6-12-2023

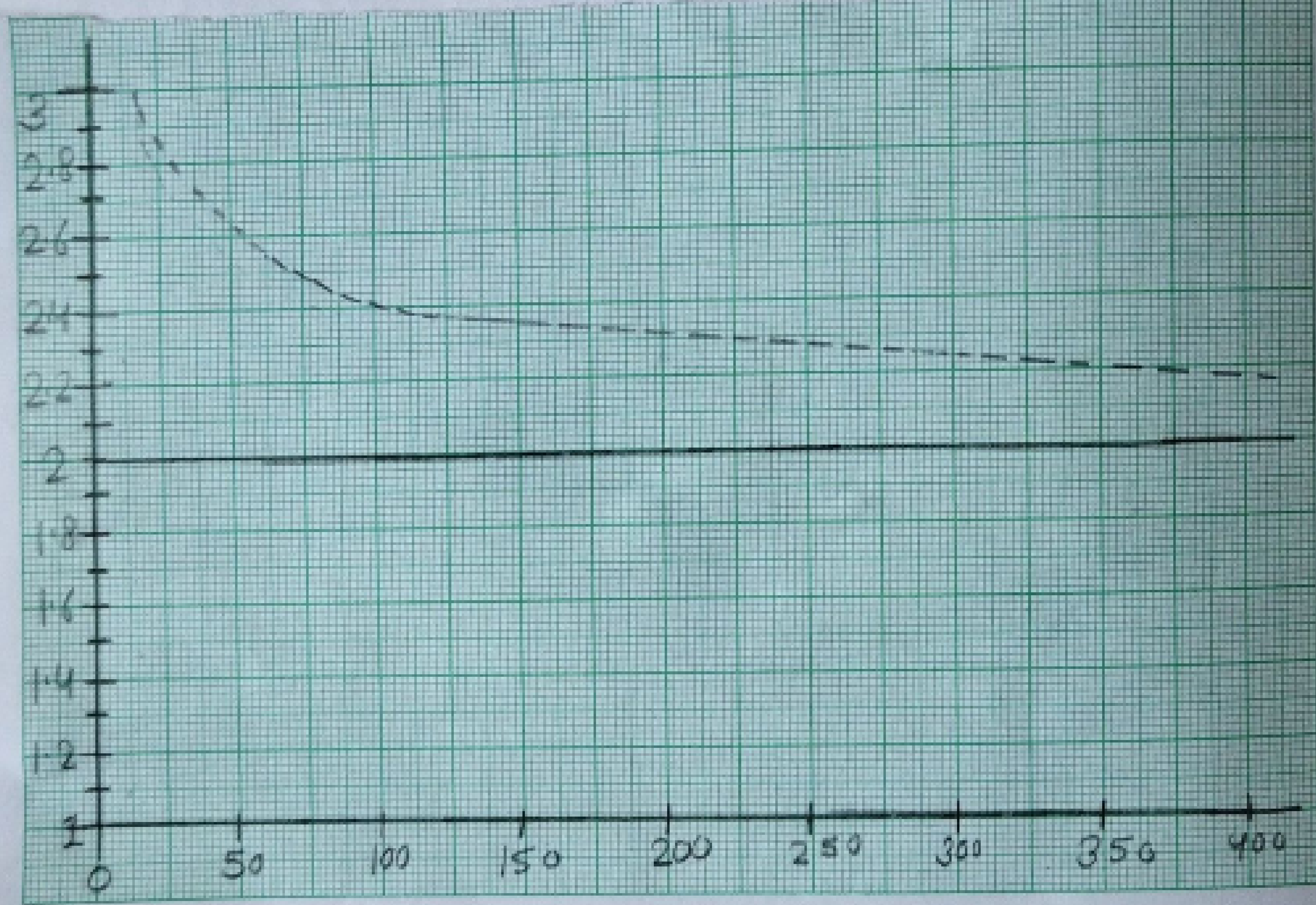
Experiment - 1

Write a program to define of function executes from command prompt, which shows convergence or not convergence of sequence $f(n) = f_n = \{[3+2\sqrt{n+1})]/(\sqrt{n+1})\}$ to 2.

```
// Graph of the sequnce f(n) = (3+2* sqrt(n+1)/sqrt(n+1)
function seqvar (1,N)

  i=1;
  n=1:N;
function f = fun1(n)

  f= (3+2* sqrt(n+1)/ sqrt (n+1)
  end function

if i<=n  & abs (fun1(i)-1)>abs (fun1(i+1)-1)
    i= i+1;
else
  disp ("sequence is not convergent")
end
xtitle ("Graph of the sequenee f(n) =(3+2* sqrt(n+1)/
                                          sqrt(n+1)")
Plot (n, fun1)
Plot (n, fun1= 1, "r--")
 P= gca();
P. data_bounds = [1, 1 -1 ; N. 1+ 1];
```

Signature

Serial No. Notes Date



Signature

```
gcf(). axes_size = [700 500];
  endfunction
```

. . . .

<u>Execute and input</u>

```
-->exec('/users/collegeadmin/sequen.sce',-1)
-->seq_var(2,400)
```

<u>Observation Ex-4:</u>

From the graph of the function sequence $f(n) = f_n = \{[3+2\sqrt{(n+1)}]/\sqrt{(n+1)}\}$ we have observed that the graph is going to the two ($l=2$) line as n- increasing. Therefore we can say that this sequence is convergent or converging to 2.

Serial No. 3 Notes Date 6-12-2021

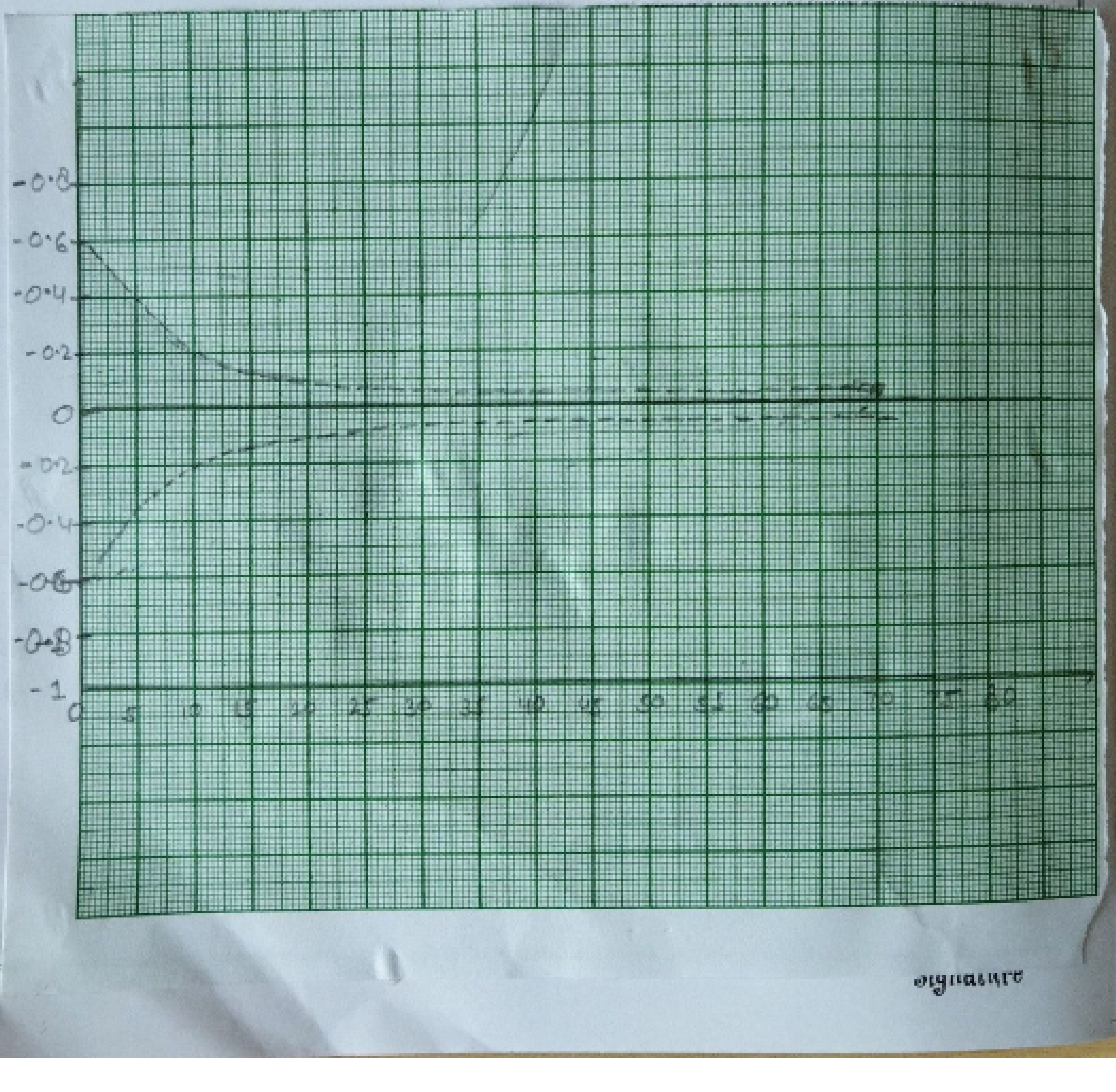
Experiment - 2

Write a program for sequence $<(-1)^n/n>$ which is bounded by [-1,1]. Then verify Bolzano Weierstrass Theorem that this sequence has at least one limit point. If it has two limit point than show graphically that there are two subsequences converging on the points.

```
// "Graph of the sequence f(n) = (-1)^n/n"
format (3);

function seq bdd (a, b, N)

  i= 1;
  n= 1 : N;

function f = fun2 (n)

     f = (-1)^n/n

endfunction
if i< =n     & abs (fun2(i) -a)>abs (fun2 (i+1)-a)
               abs (fun2 (i) -b) > abs (fun2 (i+1)-b )

i= i+1;
    disp("limit point of the sequence is /are" )
  disp(fun2 (10000));
```

Signature

```
disp (fun2 (10001));
if abs (fun2(10000) - fun2 (10001)) < .00001
disp (" sequence is convergent and converging to"
     fun2 (10000));

   else
disp (" sequence is oscillatory consisting two
limit points. So it has subsequence converging
on these limit points");
disp (" First limit point is", fun2 (10000));
disp (" secound limit points is", fun2 (10001));
        end
  else
     disp ("sequence is not convergent")
  end
xtitle ("Graph of the sequence f(n) = (-1)^n/n")

plot (n, fun2, ".")
plot (n, fun2 (1000), "r-")
plot (n fun2 (1001), "r-")

p = gca ();
 p. data_bounds = [1, a; N, b ];
gcf (). axes_size = [700 500];
  end function
```


-0·8
-0·6
-0·4
-0·2
0
-0·2
-0·4
-0·6
-0·8
-1
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80

Input function variable value

--> seq_fold (-1, 1, 1000)

Output :

"Limit point of the sequence is /are"
0.00001 // about to 0
-0.0000010 // about to 0

"sequence is convergent and converging to"

0.00001 or zero

Observation Ex-2 :

from the output graph we can say that this sequence $\langle(-1)^n/n\rangle$ converging to 0(zero), although its all subsequence converge to zero yet two subsequence (1/n & -1/n) but both sequence have different graph which shows the convergance to zero.

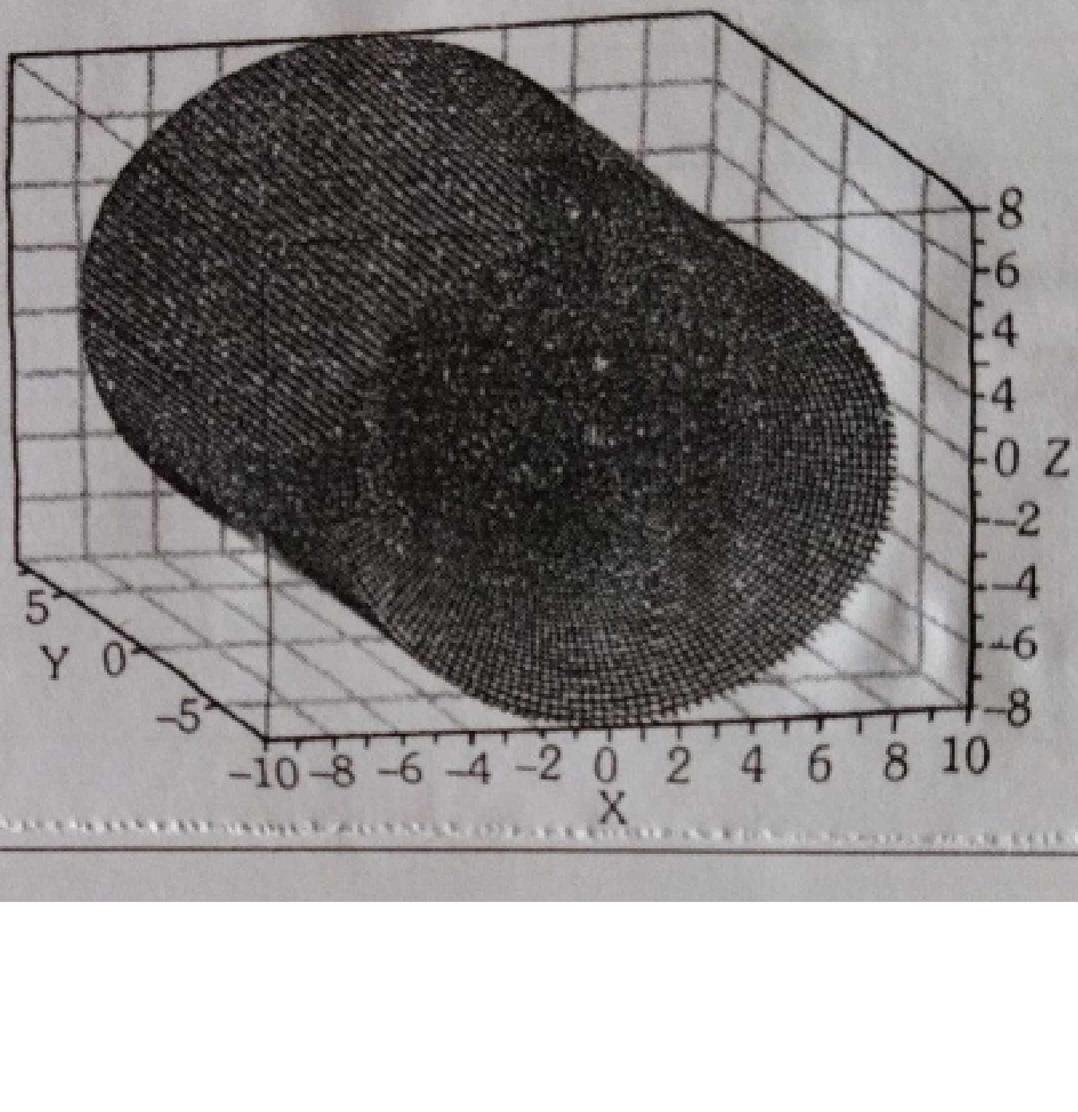
Experiment - 3

Write a program to draw a surface of revolution of the curve $y^2 = 4ax$ about y-axis.

```
// Revolution of the parabola y^2 = 4ax
   about y-axis
a= 2;

u1 = linspace (-8, 8, 150);

v1 = linspace (-%pi, %pi, 150);

deff ("[x, y, z] = fun (u,v)", ["x=((u^2)/
                 (4*a)).*cos(v)"; "y=u";
              "z= ((u^2)/(4*a)).*sin(v)"]);

orig = [0 0 0];

[xx, yy, zz] = eval3d(fun, u1, v1);

clf ();

surf (xx, yy, zz);

xgrid (5, 3, 1)
```

OUTPUT:

The surface generated by the revolution of the parabola y^2=4ax about Y-axis for a=2



Serial No. 7

Notes

Date 07-12-2023

xtitl ("The surface generated by the Revolution of the parabala
y^2 = 4ax about y- axis for a=2")

gcf(). color_map = coolcolormap(50);

a = gca();

a. data_ bounds =[-10, -0, -8; 10, 8, 8]

a. rotation_ angles = [70 250];

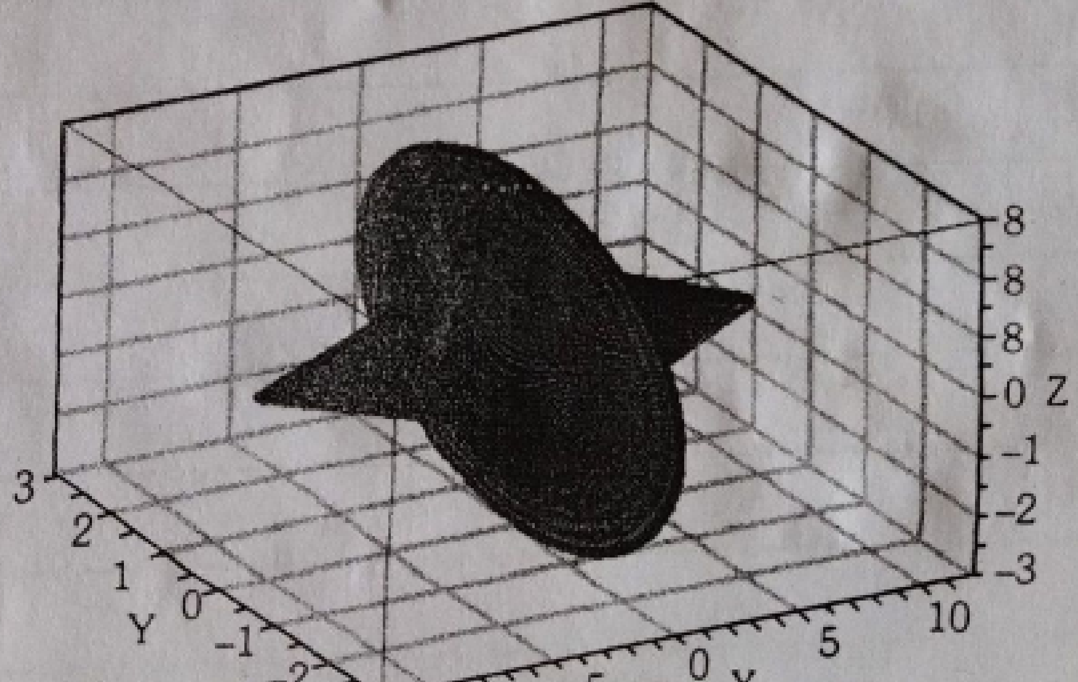
Experiment -4

Write a Program to draw a surface of revolution of the tractrix
$x = a.\cos(t) + 1/2.\ a.\log(Tan^2(t/2))$,
$y = a.\sin(t)$ about x-axis.

```
// Revolution of the Tractrix :

    X = a.cos(t)+ 1/2 . a. log(Tan^2 (t/2)),
    y = a.sin(t)

a= 3;

u1 = linspace (-16, 16, 100);

v1 = linspace (-%pi, %pi, 100);

deff ("[x, y, z]= fun (u,v)"

      ["x = a* cos(u) + (a/2)* log(tan (u/2)^2)";

orig = [0 0 0]

[xx, yy, zz] = eval3dp (fun, u1, v1);

clf();

surf (xx, yy, zz);
```

OUTPUT:

The surface generated by the revolution of the
Tractrix x=a Cost (t)+1/2 a log (Tan^2(t/2)), y=a Sin(t) about X-axis



Example 8: Write a program to draw a surface of revolution of the Lemniscate $r^2 = a^2$. Cos(2u) about the initial line.

Serial No. 9

Notes

Date 07-12-2023

xgrid (5, 3, 1)

xtitle (" The surface generated by the revolution of Tractrix x = a. cos(t) + 1/2 . a. log (Tan^2 (t/2)), y = a.sin(t) about x- axis")

a = gca ();

a. data_ bounds = [-12, -3, -3; 12, 3, 3]

a. rotation_ angles = [55 240];