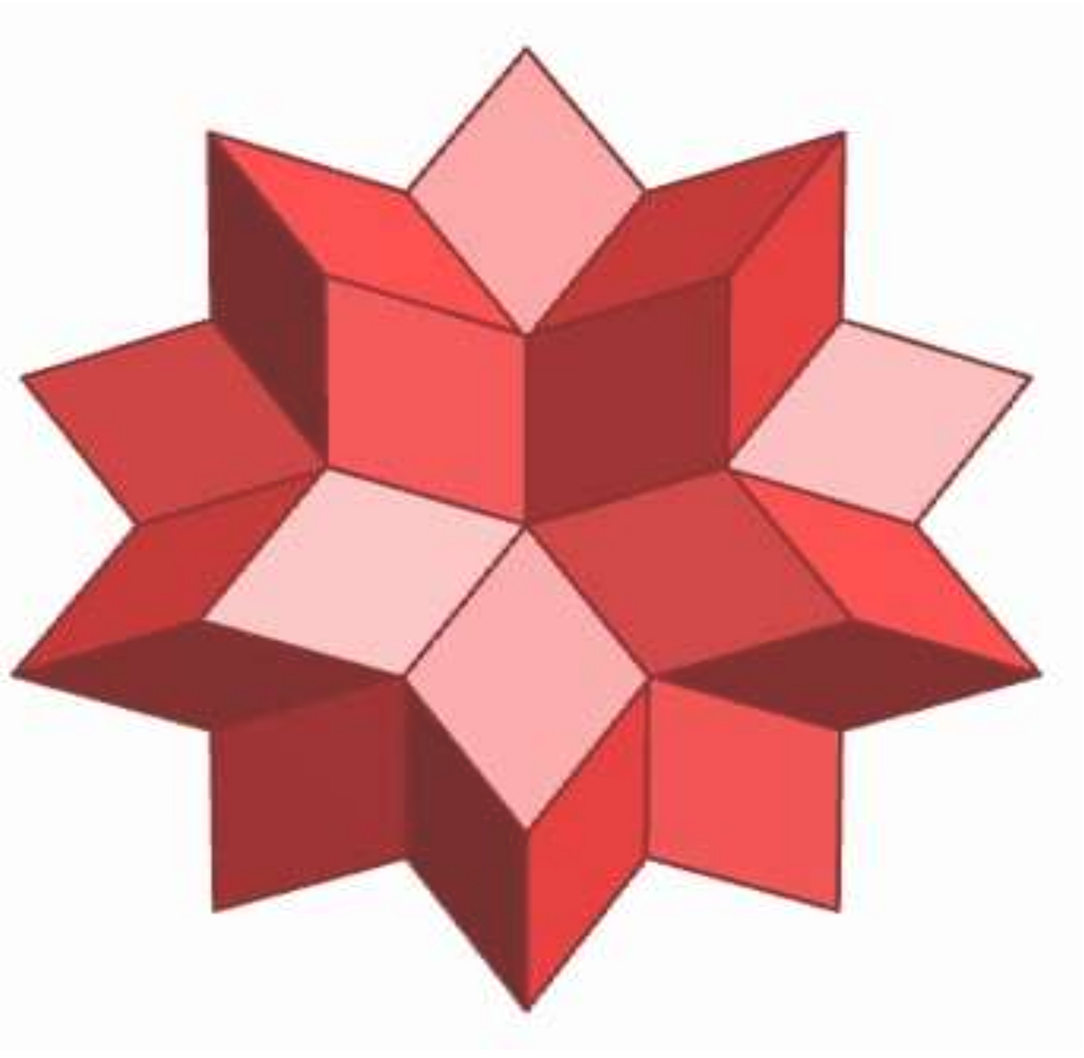


UNIFORM CONVERGENCE

MAT/19/83

SUHANI SHARMA

What is uniform convergence ?

Let A be a non empty subset of R. A sequence of function ; fn : A -> R is said to converge uniformly on A to a function f if and only if for every ε >0 , there is an Natural number N such that

For every n≥ N implies $|f_n(x) - f(x)| < \varepsilon$

MEANINGS.

- [Table[expr,n]] – generates a list of n copies of expression.
- PlotStyle - PlotStyle is an option for plotting and related functions that specifies styles in which objects are to be drawn.

- **Epilog- Is an option for graphics functions that gives a list of graphics primitives to be rendered after the main part of the graphics is rendered.**
- **Opacity[*value*] – Is a graphics directive that specifies that graphical objects that follow are to be displayed.**

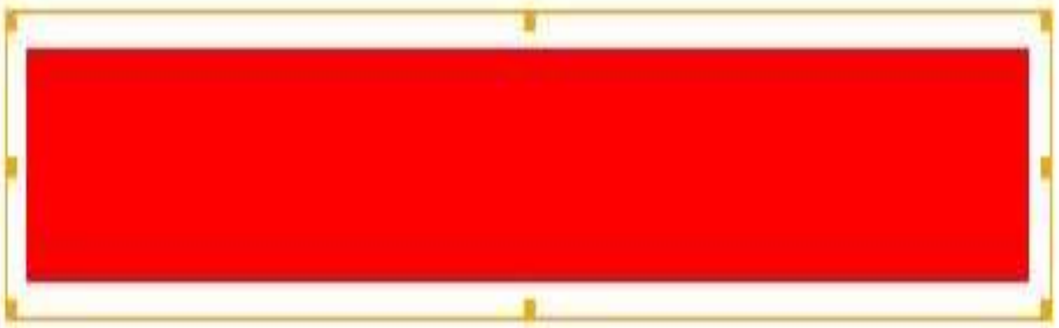
(Where opacity is defined as the quality of being difficult to see through; the fact of being opaque)

- **EdgeForm[*g*]- Is a graphics directive that specifies that edges of polygons and other filled graphics objects are to be drawn using the graphics directive or list of directives *g*.**
- **GrayLevel[*level*]- Is a graphics directive specifying that objects that follow are to be displayed in the gray level given.**

- **Rectangle[{x_{min},y_{min}},{x_{max},y_{max}}] i.e. represents an axis-aligned filled rectangle from {x_{min},y_{min}} to {x_{max},y_{max}}.**

```
In[12]:= Graphics[{Red, Rectangle[{0, 0}, {4, 0.5}]}]
```

Out[12]=



Manipulate

[Plot[Table [function , {variable , maximum value } ,{ x axis range} , Plot Range-> {y axis range } ,

Plot Style-> {color of the plot lines , thickness} , Epilog-> {Opacity [value] , color of the Rectangle , Edge Form[Gray Level[level]], Rectangle[{x axis , y axis}]}] ,

{m, min , max , step size, Appearance→"Labeled"},

{ε , min, max , step size ,Appearance → "Labeled"},

{a , min , max, Appearance → "Labeled"} ,

{l , min ,max ,Appearance → "Labeled"}]

To understand the embedded commands , let's consider an example .

$$Fn(x) = \sqrt{x^2 + 1/n^2}$$

Which is point wise convergent to |x| for every x belonging to R.

```
In[1]:= Manipulate[Plot[Table[Sqrt[x^2+(1/n^2)], {n, m}], {x, -5, 5}, PlotRange→{-2, 2},
    PlotStyle→{Magenta, Thick}, Epilog→{Opacity[.5], LightOrange,
     EdgeForm[GrayLevel[0.5]], Rectangle[{-a, l-ϵ}, {a, l+ϵ}]}],
   {m, 1, 40, 1, Appearance→"Labeled"}, {ϵ, 0.01, 0.5, 0.001, Appearance→"Labeled"}, {a, 0,
    5, 0.01, Appearance→"Labeled"}, {l, 0, 2, 0.01}]
```

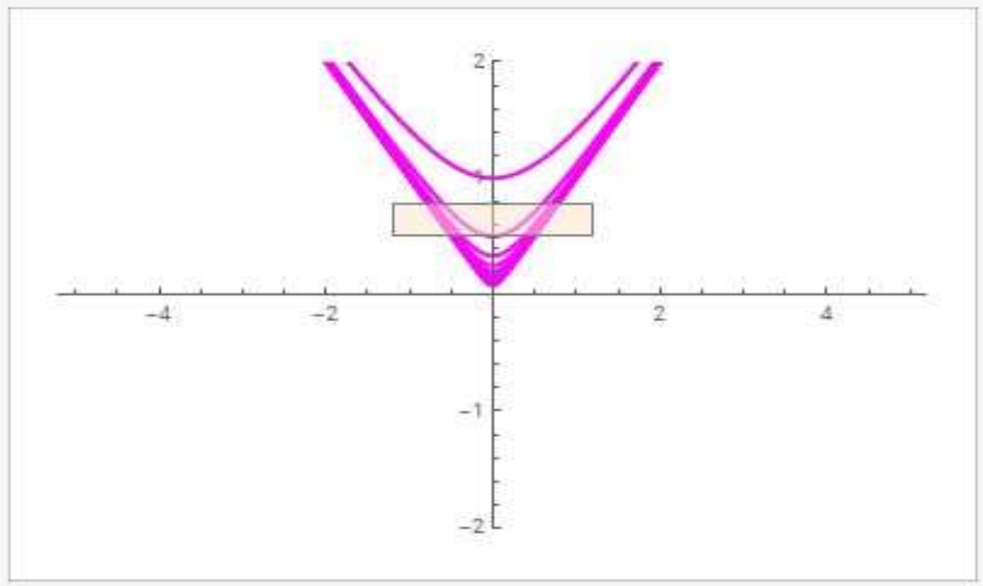
m 13

ϵ 0.137

a 1.19

l

Out[1]=



CONCLUSION

The given sequence of function converges uniformly to the function f(x)=0 for every x belonging to R.

THANK YOU

CLIC HERE TO GET INTO MY MATHEMATICA PRESENTATION:

UNIFORM CONVERGENCE .