**Sequence & Series**

In this e-handbook we can discuss Sequences & Series unit (module ),

it covers all over India (B.E/B.TECH) syllabus.

Sequence: Definition of a Sequence, limit; Convergent, Divergent and Oscillatory sequences.

Series: Convergent, Divergent and Oscillatory Series; Series of positive terms; Comparison

test, p-test, D-Alembert’s ratio test; Raabe’s test; Cauchy’s Integral test; Cauchy’s root test;

logarithmic test. Alternating series: Leibnitz test; Alternating Convergent series: Absolute

and Conditionally Convergent

i.Infinite series definition

ii.nth partial sum

iii. Necessary condition for convergent

And problems

Click the following link for above details

<https://www.youtube.com/watch?v=PBGFKGUvdKY&t=23s>

**Geometric Series Test**





**Test the convergence of**

   

 

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<https://www.youtube.com/watch?v=XW9x_rrO2tQ>

**P-Series test**





**Test the convergence of**

   

  

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<https://www.youtube.com/watch?v=7nW8tjA7o7I>

**Comparison Test**

and are two series of positive

terms and  for any , n=1,2,,3…..



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**Test the convergence of**

 

**Limit Comparison Test**

and are two series of positive

terms and 



Click the following link for more details

<https://www.youtube.com/watch?v=J9TcbzPdaQY>

Test the convergence of 

Click the following link for solved problem

<https://www.youtube.com/watch?v=Lyqsthim1TY>

Test the convergence of 

Click the following link for solved problem

<https://www.youtube.com/watch?v=Bqcwd3MAfXM>

Test the convergence of 

<https://www.youtube.com/watch?v=vljEH9JSBpc>

**Model 1; Test the convergence of**

1. 2.

3.  4.

5.  6.

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<https://www.youtube.com/watch?v=uIA6DABbWho&t=379s>

**Model 2; Test the convergence of**

 

 

 



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<https://www.youtube.com/watch?v=YXXbIKrNRZU>

**Test the convergence of**



Click the following link for solved problem

<https://www.youtube.com/watch?v=RwH8_uVqTJ4>

**Test the convergence of**



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<https://www.youtube.com/watch?v=6_Zrdj6zI_A&t=80s>

**Cauchy’s nth Root Test**

is a series of positive terms

Such that 



**Test the convergence of**

  

 

 

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**Test the convergence of**

 



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**D’Alembert’s Ratio test (or) Ratio test**

is a series of positive terms and

If 



Note: if “Ratio Test” fails we have to go for Raabe’s test (or) Logarthmic test

<https://www.youtube.com/watch?v=InvwVeMIUiA>

**Test the convergence of**

  

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<https://www.youtube.com/watch?v=U2SNLtpK2h8&t=292s>

**Test the convergence of**



Click the following link for solved problems

<https://www.youtube.com/watch?v=32KYczeCThg&t=1107s>

**Test the convergence of**



Click the following link for solved problem

<https://www.youtube.com/watch?v=t3d6cYVmChY>



Click the following link for solved problem

<https://www.youtube.com/watch?v=yxj5rXFkp7U>



Click the following link for solved problem

<https://www.youtube.com/watch?v=YZVKqZBtWcg>

**Test the convergence of**







Click the following link for solved problems

<https://www.youtube.com/watch?v=1cfmmR1P27w>

**Raabe’s Test**

is a series of positive terms and

if 



For more details click the following link

<https://www.youtube.com/watch?v=RFXX_k2yHXw>

**Test the convergence of**



Click the following link for solved problem

<https://www.youtube.com/watch?v=ddFM-oDza6s>



Click the following link for solved problem

<https://www.youtube.com/watch?v=MtqNtY5a9SE>



Click the following link for solved problem

<https://www.youtube.com/watch?v=-3cj3oQU7Mg>



Click the following link for solved problem

<https://www.youtube.com/watch?v=OhPD2ojmiiQ>

  
Click the following link for solved problem

<https://www.youtube.com/watch?v=Rz3vuNZVnFY>

Logarithmic Test

is a series of positive terms and

if 



For more details click the following link

<https://www.youtube.com/watch?v=YSbjfkB8Jg8>

1. **Discuss the convergence of the series**



Click the following link for solved problem

<https://www.youtube.com/watch?v=y3_I--J7U1c>

**Integral Test**

Let f be a non-negative decreasing function on 

Then the series and the improper integral

 is converges or diverges together

according to the integral value is finite or infinite.

<https://www.youtube.com/watch?v=7Txu54lYlt0>

1. Prove that  is convergent

 Click the following link for solved problem

<https://www.youtube.com/watch?v=PQdj1NBQviE&t=21s>

1. Show that is divergent.

 Click the following link for solved problem

<https://www.youtube.com/watch?v=3w003minPlU>

**Alternating Series**

A Series whose terms are alternatively +ve and –ve is

called an Alternating Series

This is in the form of 

for more details click the following link

<https://www.youtube.com/watch?v=zq_uwUDPiA8&t=41s>

Note : To test the convergence of following series we have only

**Leibnitz’s Test**

The alternating series **** where un>0, is said to be **convergent**

if it satisfies the following condition.

1. i.e. each term is numerically less than its preceding term
2. 

For more details click the following link

<https://www.youtube.com/watch?v=LgsOUEzXe-w>

Discuss the convergence of the series







Click the following link for solved problems

<https://www.youtube.com/watch?v=oG6YoERagXM&t=243s>