

Comparison Tests

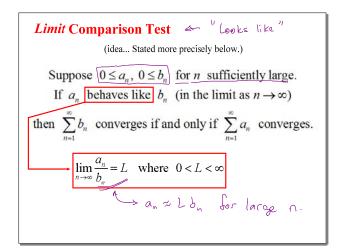
Idea: If the terms eventually behave like or better than the terms in a known convergent series, then the series converges. If the terms eventually behave like or worse than the terms in a known divergent series then the series diverges.

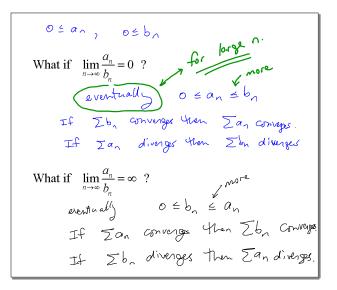
strict Comparison Test

Suppose $0 \le a_n \le b_n$ for *n* sufficiently large.

If
$$\sum_{n=1}^{\infty} b_n$$
 converges then $\sum_{n=1}^{\infty} a_n$ converges.

If
$$\sum_{n=1}^{\infty} a_n$$
 diverges then $\sum_{n=1}^{\infty} b_n$ diverges.





Example:
$$\sum_{n=1}^{\infty} \frac{1}{n^2+1}$$
Thermal :
$$\sum_{n=1}^{\infty} \frac{1}{n^2+1} \Rightarrow 0$$
Got to writ!)

3 attempts: (at to writ!)

4 to writ!

4 to writ!

4 to writ!

4 to writ!

5 to discreasing for $\frac{1}{n^2+1} \Rightarrow 0$

Takegral Test:
$$f(x) = \frac{1}{n^2+1} \Rightarrow 0$$
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The integral test:

The series comenges.

Example:
$$\sum_{n=3}^{\infty} \frac{2n^2 + 3n + 1}{3n^4 + 5n + 6}$$

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$$\sum_{n=2}^{\infty} \frac{2n^4$$

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1.
$$\sum_{n=1}^{\infty} \frac{2n+1}{3n^3+5n}$$

(0) Converges

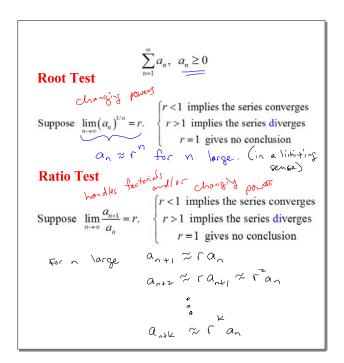
- $2. \quad \sum_{n=2}^{\infty} \frac{2n+1}{3n^2+5n}$ (0) Converges
- (1) Diverges
- (1) Diverges

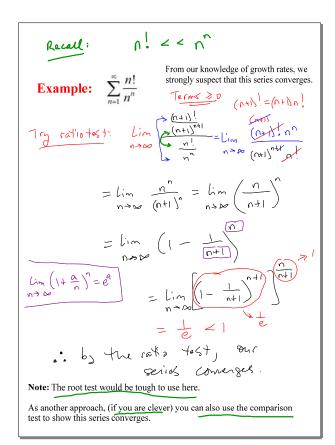
Root and Ratio Tests

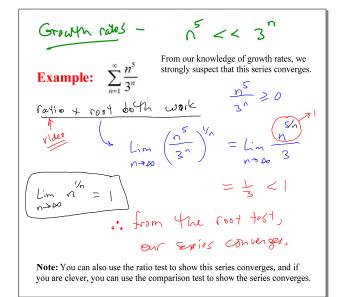
(Determining Whether a Series Behaves Like a Geometric Series)

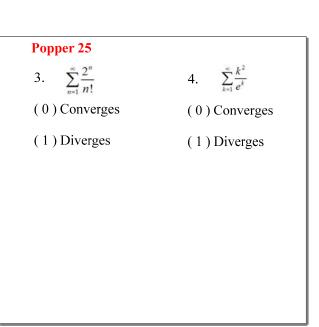
$$\sum_{n=1}^{\infty} a_n, \ a_n \ge 0$$

Idea: If the terms behave better than the terms in a convergent geometric series, then the series converges. If the terms behave worse than the terms in a divergent geometric series then the series diverges.









Review

Convergence Tests for Series

- 1. Geometric Series
- 2. Divergence Test

Convergence Tests for Series with Nonnegative Entries

- 1. Comparison Test
- 2. Limit Comparison Test
- 3. Integral Test
- 4. p-series Test
- 5. Root Test
- 6. Ratio Test