

Lecture 24

24-1

Limit Comparison Test

Suppose that $\sum a_n$ & $\sum b_n$ are series with positive terms. If $\lim_{n \rightarrow \infty} \frac{a_n}{b_n} = C$

where c is a finite number and $c > 0$, then either both series converge, or both diverge.

proof:

Ex: Test the following series for convergence:

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$$(a) \sum_{n=1}^{\infty} \frac{1}{n^2-3}$$

$$(b) \sum_{n=1}^{\infty} \frac{n^2-5n}{n^3+n+1}$$

$$(c) \sum_{n=1}^{\infty} \frac{\sqrt{n^4+1}}{n^3+n^2}$$

$$(d) \sum_{n=1}^{\infty} \left(1 + \frac{1}{n}\right)^3 \pi^{-n}$$

$$(e) \sum_{n=1}^{\infty} \frac{1}{n!}$$