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## **Limit Comparison Test**

$$({a_n}, {b_n} > 0)$$

Series:  $\sum_{n=1}^{\infty} a_n$ 

#### Condition of Convergence:

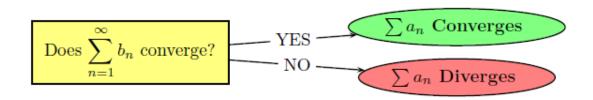
$$\lim_{n\to\infty}\frac{a_n}{b_n}=L>0$$
 and  $\sum_{n=0}^{\infty}\,b_n$  converges

# Condition of Divergence:

$$\lim_{n\to\infty}\frac{a_n}{b_n}=L>0$$
 and  $\sum_{n=0}^{\infty}b_n$  diverges

#### LIMIT COMPARISON TEST

Pick 
$$\{b_n\}$$
. Does  $\lim_{n\to\infty} \frac{a_n}{b_n} = c > 0$  refinite &  $a_n, b_n > 0$ ?



### Limit Comparison

if  $\lim_{n\to\infty} \frac{a_n}{b_n}$  is finite and positive both series converge or both diverge (use with "messy" algebraic series, usually compared to a *p*-series)

<u>Limit Comparison Test</u>: Let  $\sum_{n=1}^{\infty} a_n$  and  $\sum_{n=1}^{\infty} b_n$  be a series of nonnegative terms, with

 $a_n \neq 0$  for all sufficiently large n, and suppose that  $\lim_{n \to \infty} \frac{b_n}{a_n} = c > 0$ . Then the two series either both converge or both diverge.