

Lecture 9

Monday, April 17, 2023 8:32 AM

* Questions....

We know that a geometric series with common ratio $r \in (-1, 1)$ is convergent.

Comparison test

- If $|a_n| \leq b_n$ and $\sum b_n$ converges then $\sum a_n$ also converges.
- If $a_n \geq b_n \geq 0$ and $\sum b_n$ diverges then $\sum a_n$ also diverges.

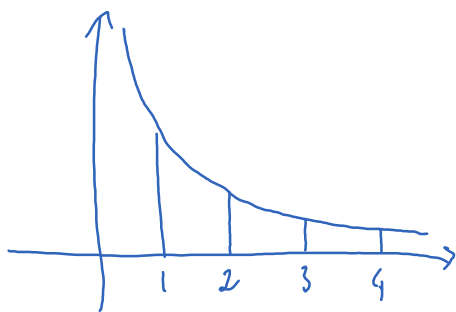
Ex :

$$\sum \frac{(-1)^n}{2^n + n}$$

$$\sum \frac{1}{2^n - n}$$

Integral test

$$a_n = f(n)$$



If f is a nonnegative and decreasing function then

$$\sum a_n \text{ converges} \Leftrightarrow \int_1^{\infty} f(x) dx \text{ converges}$$

* Some problems to practice:

$$\sum \frac{1}{n}, \quad \sum \frac{1}{n!}, \quad \sum \frac{1}{\ln n}, \quad \sum \frac{1}{n \ln n}, \quad \sum \frac{1}{n(\ln n)^2}$$

$$\sum \frac{1}{2^n}, \quad \text{not this one} \quad \sum \frac{(-1)^n}{2^n}$$