

Tutorial

Week 4

November 8, 2024

1. Analyze the following geometric series:

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

(b) $\sum_{n=2}^{\infty} \frac{(-5)^n}{8^{n+2}}$

(c) $\sum_{n=1}^{\infty} \frac{10^n + 5^{2n}}{6^{2n}}$

Wellknown series:

- Armonic serie
- Geometric series.
- telescopic series
- p -series

Criteriaums for series:

- Comparison tests (only for non-negative series)
- Absolute convergence test
- D'alambert test
- Cauchy n-root criterium

2. Decide if the following series converges

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

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

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

$$(d) \sum_{n=1}^{\infty} \frac{\sin(n+3)}{n^2}$$

$$(e) \sum_{n=1}^{\infty} \frac{1}{2^n + n}$$

$$(f) \sum_{n=1}^{\infty} \frac{n}{n^4 - 2}$$

$$(g) \sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{\sqrt{n}}$$

$$(h) \sum_{n=1}^{\infty} \frac{n!}{(-100)^n}$$