Studio serie

domenica 6 febbraio 2022 19:41

1) $\sum \frac{1}{(n+n^a)\ln^3 n}$

Converge: Va

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

$S_3 = \left[1-\frac{1}{2}\right]_1 + \left[1-\frac{1}{3}\right]_2 + \left[1-\frac{1}{4}\right]_3 = 1-\frac{1}{4}$

3) Somma serie

$\sum_{n=2}^{+\infty} 5*\left(\frac{-1}{3}\right)^n = \frac{1}{5}\sum_{n=2}\left(-\frac{1}{3}\right)^n = \frac{1}{5}*\sum_{n=0}\left(\frac{-1}{3}\right)^n - \left(\frac{-1}{3}\right)^0 - \left(\frac{-1}{3}\right)^1 = 5*\left(\frac{1}{1+\frac{1}{3}}+1+\frac{1}{3}\right)$

$\frac{1}{5}*\left(\frac{9}{12}+\frac{12}{12}+\frac{4}{12}\right) = \frac{1}{5}*\frac{25}{12} = \frac{5}{12}$

4) $\sum (-1)*e^{\frac{1}{n^2}}$

Soddisfa criteri convergenza?

$\lim_{x\to\infty}(-1)^n * e^{\frac{1}{n^2}} = (-1)^n * 1 \to no$

5) $\sum (-1)^n * \frac{4n+\sqrt{n}}{n^2\ln^2 m}$

- *Diverge*
- *Converge ma non assolutamente -> vero*
- *Converge assolutamente*
- *Oscilla*

Libnitz:

- $\frac{4n+\sqrt{n}}{n^2\ln^2 n} > 0 \to vero$
- $\lim_{x\to\infty}\frac{4n+\sqrt{n}}{n^2\ln^2 n} \sim \frac{4n}{n^2} \to 0$
- $a_{n+1} < a_n$

Assolutamente:

$\frac{4n+\sqrt{n}}{n^2\ln^2 n} \sim \frac{4n}{n^2} = \frac{1}{n} \to diverge$

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

-> radice

$\sqrt[n]{\frac{(n+1)^n}{(2n)^n}} = \frac{n+1}{2n} \to 0 \to converge$

7) $\sum_{n=1} a_n = 5, \quad \sum_{n=3} a_n = a_n - a_1 - 1_2$

8) $\sum n e^{1-\frac{1}{n}} * \sin\frac{1}{n^a} \sim n e^{1-\frac{1}{n}} * \frac{1}{n^a} \sim n * \frac{1}{n^a}$

$a > 2 \to n*\frac{1}{n^3} \to \frac{1}{n^2} \to converge$

$a = 2 \to n*\frac{1}{n^2} \to \frac{1}{n} \to diverge$

$0 < a < 2 \to n*\frac{1}{n^1} \to 1 \to diverge$