ESERCIZI SULLE SERIE NUMERICHE

Esercizio 1

Studiare la convergenza semplice ed assoluta delle seguenti serie:

$(i)\sum_{n=1}^{\infty}\left(\frac{3x-10}{2}\right)^n\cdot\frac{1}{n^2}$

$(ii)\sum_{n=1}^{\infty}\left(\frac{\cos n\pi}{x-2}\right)^n\cdot\frac{1}{n}$

$(iii)\sum_{n=1}^{\infty}\left(\ln x+4\right)^n,\ x>0$

$(iv)\sum_{n=1}^{\infty}\left(e^{-x}+\frac{3}{5}\right)^n$

$(v)\sum_{n=1}^{\infty}\left(e^{x^2-2}-2\right)^n\cdot\frac{1}{\sqrt{n}}$

Esercizio 2

Studiare la convergenza delle serie:

$(i)\sum_{n=1}^{\infty}\frac{(-1)^n}{\ln n}$

$(ii)\sum_{n=1}^{\infty}\frac{\cos n\pi}{e^n+3n}$

$(iii)\sum_{n=1}^{\infty}\frac{(-1)^n}{n^2-20n+2}$

$(iv)\sum_{n=1}^{\infty}\frac{\sin\left(\frac{\pi}{2}(2n+1)\right)}{n}\cdot\ln n$

Esercizio 3

Studiare la convergenza semplice ed assoluta delle seguenti serie:

$(i)\sum_{n=1}^{\infty}\left(\frac{1+x}{1+nx}\right)^n$

$(ii)\sum_{n=1}^{\infty}\frac{\log(n^2x)}{n^2+x^2},\quad x>0$

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

$(iv)\sum_{n=1}^{\infty}\frac{x^{2n}}{n}+\frac{n^{2x}}{x},\quad x>0$

$(v)\sum_{n=1}^{\infty}\frac{1}{3+(\log x)^{2n}},\quad x>0$

$(vi)\sum_{n=1}^{\infty}\log\left(\sqrt[n]{1+\frac{x}{n}}\right),\quad x>0$

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

$(viii)\sum_{n=1}^{\infty}\frac{x+\sin\frac{x}{n}}{n^x}$