CÁLCULO DIFERENCIAL E INTEGRAL II
Laboratorio 15
Primavera 2019
Series. Criterios de convergencia. Convergencia absoluta y condicional

1. Encuentra el valor de la suma:

   (a) $\displaystyle\sum_{n=1}^{\infty} \frac{\pi^n}{3^{2n-1}}.$

   (b) $\displaystyle\sum_{n=2}^{\infty} \frac{(-1)^{n+2} + 3^{n+1}}{6^n}.$

   (c) $\displaystyle\sum_{n=1}^{\infty} \left(\sqrt[n+1]{n+1} - \sqrt[n]{n} \right).$

   (d) $\displaystyle\sum_{n=1}^{\infty} \frac{2}{n(n+2)}.$ Sugerencia: usa fracciones parciales.

2. Estudia la convergencia de las siguientes series:

   (a) $\displaystyle\sum_{n=1}^{\infty} \frac{1}{2n+1}.$

   (b) $\displaystyle\sum_{n=1}^{\infty} \frac{\ln\sqrt{n}}{n}.$

   (c) $\displaystyle\sum_{n=1}^{\infty} \left(\frac{1}{7}\right)^{1/n}.$

   (d) $\displaystyle\sum_{n=1}^{\infty} \frac{1}{2\sqrt{n} + \sqrt[3]{n}}.$

   (e) $\displaystyle\sum_{n=1}^{\infty} \frac{(2n)!}{3!\, n!\, 3^n}.$

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

   (g) $\displaystyle\sum_{n=1}^{\infty} \tan\left(\frac{1}{2^n}\right).$

3. Analiza si las siguientes series convergen absolutamente, convergen condicionalmente o divergen:

   (a) $\displaystyle\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{\sqrt{n^3}}.$

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

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

(d) $\displaystyle\sum_{n=1}^{\infty} (-1)^{n+1} \frac{3+n}{5+n}$.

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

4. Determina para qué valores de α son absolutamente convergentes o divergentes las siguientes series:

   (a) $\displaystyle\sum_{n=0}^{\infty} (1+\operatorname{sen}\alpha)^n$.

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