7. How many local extreme values does the function $f(x,y) = 10xye^{-(x^2+y^2)}$ have?

Answer :_____

命中&相似題目：講義 p.11-33 Homewor11 #3 (相似度 80%)

Homework 11

1. Let $f(x,y,z) = 1 + \dfrac{x^2}{6} + \dfrac{y^2}{12} + \dfrac{z^2}{18}$, and $\mathbf{n} = \dfrac{1}{\sqrt{3}}(1,1,1)$, find $D_{\mathbf{u}}f(1,2,3)$.

2. Find the gradient of the function $f(x,y) = \arctan\dfrac{x}{y}$ at point $(0,1)$.

3. Find all the local maxima, local minima, and saddle points of $f(x,y) = xe^{-\frac{x^2+y^2}{2}}$.

2.

a. Determine whether the series $\displaystyle\sum_{n=1}^{\infty}(-1)^n \ln\left(1 + \frac{1}{n}\right)$ diverges or converges conditionally or converges absolutely and give reasons for your answer. (6 points)

b. Show that if $\sum_{n=1}^{\infty} a_n$ converges, then $\displaystyle\sum_{n=1}^{\infty}\left(\frac{3 + \sin(a_n)}{5}\right)^n$ converges. (6 points)

命中&相似題目：講義 p.10-37 Exercise2 (a) (相似度 80%)

Exercise 2.

Determine whether the series is absolutely convergent, conditionally convergent, or divergent:

(a) $\displaystyle\sum_{n=2}^{\infty}\frac{(-1)^n}{\ln n}$ (b) $\displaystyle\sum_{n=1}^{\infty}\left(\frac{1-n}{2+3n}\right)^n$ (c) $\displaystyle\sum_{n=1}^{\infty}\frac{(-1)^{n+1}(n!)^2}{(2n)!}$

Ans.

(a) (1) 令 $a_n = \dfrac{1}{\ln n}$．$\because a_n = \dfrac{1}{\ln n} > \dfrac{1}{\ln(n+1)} = a_{n+1}$, $\forall n = 1, 2, \cdots$．$\therefore a_n$ 為遞減

此外，顯然的，$\displaystyle\lim_{n\to\infty}\frac{1}{\ln n} = 0$

$\therefore \displaystyle\sum_{n=2}^{\infty}\frac{(-1^n)}{\ln n}$ 收斂． **#**

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

　　　$\because \dfrac{1}{\ln n}>\dfrac{1}{n}$　且　$\displaystyle\sum_{n=1}^{\infty}\frac{1}{n}$　發散　　$\therefore$由比較法知，　$\displaystyle\sum_{n=2}^{\infty}\left|\frac{(-1)^n}{\ln n}\right|$　發散．　**#**

綜合 (1)與 (2) 知，　$\displaystyle\sum_{n=2}^{\infty}\frac{(-1)^n}{\ln n}$　為條件收斂．