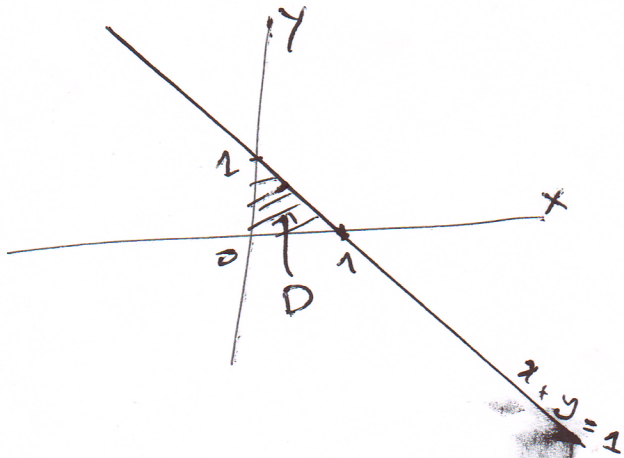


(P2)

$$I = \iint_D \cos\left(\frac{x-y}{x+y}\right) dx dy$$

:(22) =
(مقاله)

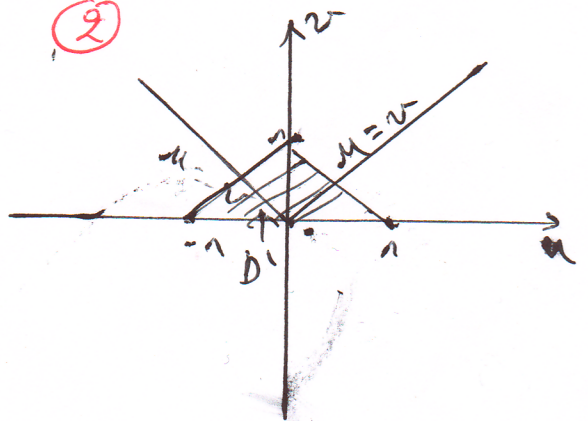


طريقة تغيير المتغير : نضع : $u = x - y$ (1)

$$v = x + y \quad \Rightarrow \quad x = \frac{u+v}{2}, \quad y = \frac{v-u}{2} = \frac{-u+v}{2}$$

$$J_p(u,v) = \begin{vmatrix} \frac{1}{2} & \frac{1}{2} \\ -\frac{1}{2} & \frac{1}{2} \end{vmatrix} = \frac{1}{4} + \frac{1}{4} = \frac{1}{2} \quad (2)$$

$$I = \iint_{D'} \cos\left(\frac{u}{v}\right) \frac{1}{2} du dv$$



$$\begin{aligned} (x,y) : (0,0) &\rightarrow (0,0) \\ (1,0) &\rightarrow (1,1) \\ (0,1) &\rightarrow (-1,1) \end{aligned} \quad (1)$$

$$I = \int_0^2 \int_{-v}^v \cos\left(\frac{u}{v}\right) \frac{1}{2} du dv = \frac{1}{2} \int_0^2 v \sin\left(\frac{u}{v}\right) \Big|_{-v}^v dv$$

$$= \frac{1}{2} \int_0^2 v \sin(1) - v \sin(-1) dv = \int_0^2 v \sin(1) dv \quad (1)$$

$$= \frac{v^2}{2} \sin(1) \Big|_0^2 = \boxed{\frac{1}{2} \sin(1)} \quad (1)$$