

- Determinar el trabajo realizado por el campo de Fuerza

$$\vec{F}(x, y) = (-16y + \sin x^2, 4e^y + 3x^2)$$

- Curva cerrada simple  $C$  en el primer y segundo cuadrante dada por las graficas

Curva  $C$

$$y = x$$

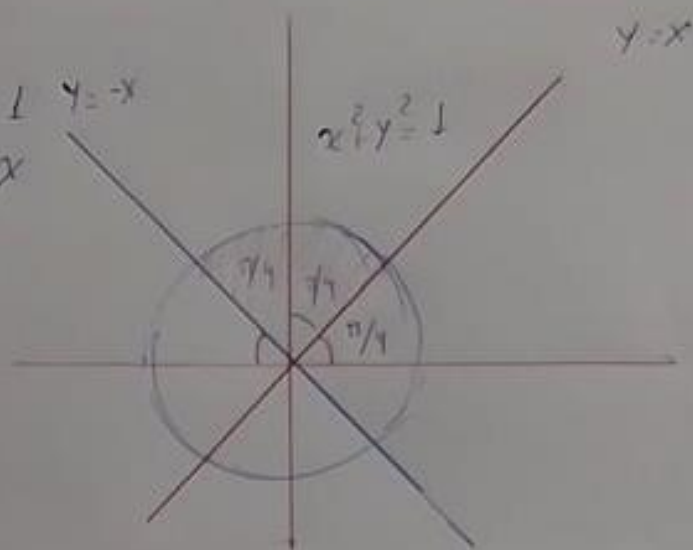
$$x^2 + y^2 = 1 \quad y = -x$$

$$y = -x$$

Parametrizando la curva  $C$

$$\lambda(t) = (\pm \cos t, \pm \sin t)$$

$$\pi/4 \leq t \leq 3\pi/4$$



$$1. F(\lambda(t)) = F(\cos(t), \sin(t))$$

$$F(\lambda(t)) = (-16 \sin(t) + \sin^2(\cos(t))^2, 4e^{\sin(t)} + 3(\cos(t))^2)$$

$$F(\lambda(t)) = (-16 \sin(t) + \sin^2(\cos(t)), 4e^{\sin(t)} + 3 \cos^2(t))$$

$$2. \lambda'(t) = (-\sin t, \cos t)$$

$$W = \int_{\lambda} F d\lambda = \int_{\pi/4}^{3\pi/4} (-16 \sin(t) + \sin^2(\cos(t)), 4e^{\sin(t)} + 3 \cos^2(t))$$

$$\cdot (-\sin t, \cos t) dt$$

$$\int_{\pi/4}^{3\pi/4} (-16 \sin(t) + \sin^2(\cos(t)))(-\sin(t)) + (4e^{\sin(t)} + 3 \cos^2(t))(\cos(t)) dt$$

$$\int_{\pi/4}^{3\pi/4} 16 \sin^2(t) - \sin^2(\cos(t))(\sin(t)) + 4e^{\sin(t)} \cdot \cos t + 3 \cos^3(t) dt$$

$$\left[ 8t - 4 \sin(2t) + \frac{2 \cos(t) - \sin(2 \cos(t))}{4} + 4 e^{\sin(t)} + (\cos^2(t) + 2) \sin(t) \right] \Big|_{\pi/4}^{3\pi/4}$$

$$\left[ 6\pi - 4 \sin\left(\frac{3\pi}{2}\right) + \frac{2 \cos\left(\frac{3\pi}{4}\right) - \sin\left(2 \cos\left(\frac{3\pi}{4}\right)\right)}{4} + 4 e^{\sin\left(\frac{3\pi}{4}\right)} + \left(\cos^2\left(\frac{3\pi}{4}\right) + 2\right) \sin\left(\frac{3\pi}{4}\right) \right] - \left[ 2\pi - 4 \sin\left(\frac{\pi}{2}\right) + \frac{2 \cos\left(\frac{\pi}{4}\right) - \sin\left(2 \cos\left(\frac{\pi}{4}\right)\right)}{4} + 4 e^{\sin\left(\frac{\pi}{4}\right)} + \left(\cos^2\left(\frac{\pi}{4}\right) + 2\right) \sin\left(\frac{\pi}{4}\right) \right]$$

$$\left[ 6\pi + 4 + \frac{(-\sqrt{2}) - \sin(-\sqrt{2})}{4} + 4 e^{\frac{\sqrt{2}}{2}} + \left(\frac{1}{2} + 2\right) \frac{\sqrt{2}}{2} \right] - \left[ 2\pi - 4 + \frac{\sqrt{2}}{4} - \frac{\sin(\sqrt{2})}{4} + 4 e^{\frac{\sqrt{2}}{2}} + \left(\cos^2\left(\frac{\pi}{4}\right) + 2\right) \left(\sin\left(\frac{\pi}{4}\right)\right) \right]$$

~~$\left(\frac{1}{2} + 2\right) \left(\frac{\sqrt{2}}{2}\right)$~~

$$4\pi + 8 - \frac{\sqrt{2}}{2}$$

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