۹۹۲۱۰۳۰ اشکان شکیبا

(۱۱

$x(t)=۲\cos t \Rightarrow dx=-۲\sin t.dt$

$y(t)=\sqrt{v}\sin ۲t \Rightarrow dy=۲\sqrt{v}\cos ۲t dt$

$W=\int (x^۲-x+y^۲)dx+(۲xy-ye^y)dy$

$\Rightarrow W=\int_۰^{\pi}\Big((۴\cos^۲t-۲\cos t+v\sin^۲ ۲t)(-۲\sin t)+(۴\sqrt{v}\cos t.\sin ۲t-$

$\sqrt{v}\sin ۲t.e^{\sqrt{v}\sin ۲t})(۲\sqrt{v}\cos ۲t)\Big)dt$

$\Rightarrow W_۱=\int_۰^{\pi}-۸\cos^۲t.\sin t.dt=\frac{۸}{۳}\cos^۳t\Big|_۰^{\pi}=-\frac{۸}{۳}-\frac{۸}{۳}=\frac{-۱۶}{۳}$

$\Rightarrow W_۲=\int_۰^{\pi}۲\cos t.\sin t.dt=\int_۰^{\pi}۲\sin ۲t.dt=-\cos ۲t\Big|_۰^{\pi}=۰$

$\Rightarrow W_۳=\int_۰^{\pi}-۱۲\sin^۲ ۲t.\sin t.dt=\int_۰^{\pi}-۱۲(۴\sin^۲t.\cos^۲t)\sin t.dt$

$=-۵۶\int_۰^{\pi}(۱-\cos^۲t)\cos^۲t.\sin t.dt=-۵۶\int_۰^{\pi}(\cos^۲t-\cos^۴t)\sin t.dt$

$=۵۶\left(\frac{\cos^۳t}{۳}-\frac{\cos^۵t}{۵}\right)\Big|_۰^{\pi}=۵۶\left(\frac{-۱}{۳}+\frac{۱}{۵}-\frac{-۱}{۳}+\frac{۱}{۵}\right)=\frac{-۲۲۴}{۱۵}$

$\Rightarrow W_۴=\int_۰^{\pi}۵۶\cos t.\sin ۲t.\cos ۲t.dt=۵۶\int_۰^{\pi}\cos t(۲\sin t.\cos t)$

$(۲\cos^۲t-۱)dt=۱۱۲\int_۰^{\pi}(۲\cos^۴t-\cos^۲t)\sin t.dt$

$$= -112\left(\frac{2}{5}\cos^5 t - \frac{1}{3}\cos^3 t\right)\Big|_0^{\pi} = -112\left(-\frac{2}{5}+\frac{1}{3}-\frac{2}{5}+\frac{1}{3}\right)$$

$$= \frac{224}{15}$$

$$\Rightarrow W_5 = \dots \quad \left(u = \sqrt{7}\sin 2t \Rightarrow du = 2\sqrt{7}\cos 2t.dt \; ; \; \begin{matrix} t=0 \to u=0 \\ t=\pi \to u=0 \end{matrix}\right)$$

$$\Rightarrow W_5 = \int_0^0 -ue^u.du = 0$$

$$W_{\sigma'} = W_1 + W_2 + W_3 + W_4 + W_5 = \frac{-14}{3} + 0 - \frac{224}{15} + \frac{224}{15} + 0$$

$$\Rightarrow W = \frac{-14}{3}$$