Exercice 8 :

1. $K = \int_0^{\pi} e^x \cos(2x)dx$

On pose u(x) = cos2x alors u'(x) = -2sin2x

et v'(x) = e^x alors v(x) = e^x

d'où $K = \left[e^x \cos 2x\right]_0^{\pi} + 2\int e^x \sin 2x dx = e^{\pi} - 1 + 2\int e^x \sin 2x dx$

or $\int e^x \sin 2x dx = \left[e^x \sin 2x\right]_0^{\pi} - 2\int_0^{\pi} \cos(2x)e^x dx = 0 - 2K = -2K$,

d'où $K = e^{\pi} - 1 + 2(-2K)$ etpar suite $K = \frac{e^{\pi} - 1}{5}$.

2. $I + J = \int_0^{\rho} e^x(\cos^2 x + \sin^2 x)dx = \int_0^{\pi} e^x dx = \left[e^x\right]_0^{\pi} = e^{\pi} - 1$

$I - J = \int_0^{\rho} e^x(\cos^2 x - \sin^2 x)dx = \int_0^{\rho} e^x \cos 2x dx = K = \frac{e^{\pi} - 1}{5}$

D'où $I = \frac{3}{5}\left(e^{\pi} - 1\right)$ et $J = \frac{2}{5}\left(e^{\pi} - 1\right)$.

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