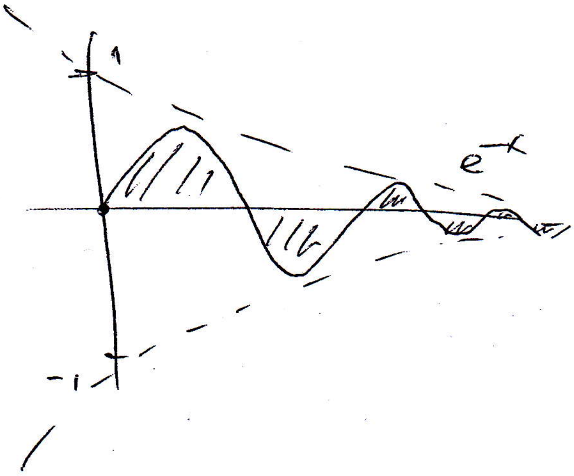
(6)



$$P = \int_0^\infty e^{-x} \sin x \, dx$$

$$\int e^{-x} \sin x \, dx \quad \left| \begin{matrix} u' = e^{-x} & u = -e^{-x} \\ v = \sin x & v' = \cos x \end{matrix} \right| = -e^{-x} \sin x + \int e^{-x} \cos x \, dx$$

$$\left| \begin{matrix} u' = e^{-x} & u = -e^{-x} \\ v = \cos x & v' = -\sin x \end{matrix} \right| = -e^{-x} \sin x + (-e^{-x}) \cos x - \int e^{-x} \sin x c$$

$$\Rightarrow 2 \int e^{-x} \sin x \, dx = -e^{-x} (\sin x + \cos x)$$

$$\int e^{-x} \sin x \, dx = -\frac{1}{2} e^{-x} (\sin x + \cos x)$$

$$P = \left[-\frac{1}{2} e^{-x} (\sin x + \cos x) \right]_0^\infty = \underbrace{\lim_{x \to \infty} -\frac{1}{2} \frac{\sin x + \cos x}{e^x}}_{\downarrow \, 0} + \frac{1}{2}(0+1)$$

$$= \underline{\underline{\frac{1}{2}}}$$