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(1)

別解

$$\left(e^{-2t}\sin 2t\right)' = -2e^{-2t}\sin 2t + 2e^{-2t}\cos 2t$$

$$\left(e^{-2t}\cos 2t\right)' = -2e^{-2t}\sin 2t - 2e^{-2t}\cos 2t$$

より，

$$e^{-2t}\sin 2t = \frac{1}{4}\left\{-\left(e^{-2t}\sin 2t\right)' - \left(e^{-2t}\cos 2t\right)'\right\}$$

$$e^{-2t}\cos 2t = \frac{1}{4}\left\{\left(e^{-2t}\sin 2t\right)' - \left(e^{-2t}\cos 2t\right)'\right\}$$

よって，

$$\int_0^{\pi} e^{-2t}\sin 2t dt = \frac{1}{4}\left[-e^{-2t}\sin 2t - e^{-2t}\cos 2t\right]_0^{\pi} = \frac{1}{4}\left(e^{-2\pi}+1\right)$$

$$\int_0^{\pi} e^{-2t}\cos 2t dt = \frac{1}{4}\left[e^{-2t}\sin 2t - e^{-2t}\cos 2t\right]_0^{\pi} = \frac{1}{4}\left(e^{-2\pi}+1\right)$$