

نعلم أن الدالة $x \mapsto e^{u(x)}$ هي دالة أصلية للدالة $x \mapsto u'(x) e^{u(x)}$. D_u

$$I_1 = \int_0^1 e^{2x} dx \quad *$$

$$= \left[\frac{1}{2} e^{2x} \right]_0^1$$

$$= \frac{1}{2} (e^2 - 1)$$

$$I_2 = \int_0^1 e^{3x-1} dx$$

$$= \left[\frac{1}{3} e^{3x-1} \right]_0^1$$

$$= \frac{1}{3} (e^2 - e^{-1})$$

$$I_3 = \int_{-1}^1 x e^{x^2} dx$$

$$= \frac{1}{2} \int_{-1}^1 (x^2)' e^{x^2} dx$$

$$= \frac{1}{2} [e^{x^2}]_{-1}^1$$

$$= 0$$

$$I_4 = \int_0^1 (x + 1) e^{x^2+2x+3} dx$$

$$= \frac{1}{2} \int_0^1 (x^2 + 2x + 3)' e^{x^2+2x+3} dx$$

$$= \frac{1}{2} [e^{x^2+2x+3}]_0^1$$

$$= \frac{1}{2} (e^6 - e^3)$$

$$I_5 = \int_0^{\frac{\pi}{2}} \sin x e^{\cos x} dx$$

$$= - \int_0^{\frac{\pi}{2}} (\cos x)' e^{\cos x} dx$$

$$= [e^{\cos x}]_0^{\frac{\pi}{2}} = e - 1$$

$$I_6 = \int_0^{\frac{\pi}{4}} (1 + \tan^2 x) e^{\tan x} dx$$

$$= \int_0^{\frac{\pi}{4}} (\tan x)' e^{\tan x} dx$$

$$= [e^{\tan x}]_0^{\frac{\pi}{4}}$$

$$= e - 1$$

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