$$\int \underbrace{e^{x}}_{dv} \underbrace{\sinh x\,dx}_{u}$$

$$du = \cosh x\,dx$$

$$v = e^{x} + C$$

$$\int u\,dv = uv - \int u\,dv$$

$$= e^{x} \sinh x\,dx$$

$$- \int \cosh x\,dx\,e^{x}$$

$$= e^{x} \sinh x$$

$$- e^{x} \cosh x$$

$$- \int e^{x} \sinh x \, dx$$

$$\int \underbrace{x^2}_{u} \underbrace{e^{-x} dx}_{dv}$$

$$v = -\frac{1}{e^x} + C$$

$$= -\frac{1}{e^x} x^2 + \int \underbrace{2x}_{u} \underbrace{\frac{1}{e^x} dx}_{dv}$$

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

$$+ \int \underbrace{\frac{1}{e^x} \underbrace{2x}_{u} dx}_{dv}$$

$$-\frac{1}{e^{x}}x^{3}-\frac{1}{e^{x}}3x^{2}$$

$$-\frac{1}{e^{x}}6x-\underbrace{\int -\frac{1}{e^{x}}\times 6}_{-\frac{6}{e^{x}}}$$

$$=-\frac{1}{e^{x}}\left(x^{3}+3x^{2}+6x+6\right)$$

$$\int \underbrace{e^{\alpha x}}_{dv} \underbrace{\sin \beta x}\, \underbrace{dx}_{dv}$$

$$v = \frac{1}{\alpha} e^{\alpha x} + c$$

$$du = \beta \cos x$$

$$= \frac{1}{\alpha} \sin \beta x . dx . e^{\alpha x}$$

$$- \int \underbrace{\frac{1}{\alpha}}_{u} \underbrace{e^{\alpha x}}_{dv} \underbrace{\beta \cos x\, dx}_{u}$$

$$= \frac{1}{\alpha} \sin \beta n e^{\alpha n}$$