Metoda per partes (po částech)

$$\int x^2\cos(3x)\mathrm{d}x = \begin{vmatrix} u' = \cos(3x) & v = x^2 \\ u = \frac{1}{3}\sin(3x) & v' = 2x \end{vmatrix} = \frac{1}{3}x^2\sin(3x) - \frac{2}{3}\int x\sin(3x)\mathrm{d}x = \begin{vmatrix} u' = \sin(3x) & v = x \\ u = -\frac{1}{3}\cos(3x) & v' = 1 \end{vmatrix}$$

$$= \frac{1}{3}x^2\sin(3x) - \frac{2}{3}\left(-\frac{1}{3}x\cos(3x) + \frac{1}{3}\int\cos(3x)\mathrm{d}x\right) = \underline{\underline{\frac{1}{3}x^2\sin(3x) + \frac{2}{9}x\cos(3x) - \frac{2}{27}\sin(3x) + C}}$$

$$\int x^2\cos x\mathrm{d}x = \underline{\underline{(x^2-2)\sin x + 2x\cos x + C}}$$

$$\int x^2\sin(2x)\mathrm{d}x = \underline{\underline{-\frac{1}{2}x^2\cos(2x) + \frac{1}{2}x\sin(2x) + \frac{1}{4}\cos(2x) + C}}$$

$$\int x\sin x\mathrm{d}x = \underline{\underline{-x\cos x + \sin x + C}}$$

$$\int x\cos(4x+3)\mathrm{d}x = \underline{\underline{\frac{1}{4}\sin(4x+3) + \frac{1}{16}\cos(4x+3) + C}}$$

$$\int x^2\sin\frac{x}{2}\mathrm{d}x = \underline{\underline{-2x^2\cos\frac{x}{2} + 8x\sin\frac{x}{2} + 16\cos\frac{x}{2} + C}}$$

$$\int xe^{3x}\mathrm{d}x = \begin{vmatrix} u' = e^{3x} & v = x \\ u = \frac{1}{3}e^{3x} & v' = 1 \end{vmatrix} = \underline{\underline{\frac{1}{3}xe^{3x} - \frac{1}{9}e^{3x} + C}}$$

$$\int (x^2+1)e^{-x}\mathrm{d}x = \begin{vmatrix} u' = e^{-x} & v = x^2+1 \\ u = -e^{-x} & v' = 2x \end{vmatrix} = -e^{-x}(x^2+1) + 2\int xe^{-x}\mathrm{d}x = \begin{vmatrix} u' = e^{-x} & v = x \\ u = -e^{-x} & v' = 1 \end{vmatrix}$$

$$= -e^{-x}(x^2+1) + 2\left(-xe^{-x} + \int e^{-x}\mathrm{d}x\right) = -e^{-x}(x^2+1) - 2xe^{-x} - 2e^{-x} + C$$

$$= \underline{\underline{-e^{-x}(x^2+2x+3) + C}}$$

$$\int xe^{-x}\mathrm{d}x = \begin{vmatrix} u' = e^{-x} & v = x \\ u = -e^{-x} & v' = 1 \end{vmatrix} = -xe^{-x} + \int e^{-x}\mathrm{d}x = \underline{\underline{-xe^{-x} - e^{-x} + C}}$$

$$\int (x^2-x+2)e^{3x}\mathrm{d}x = \underline{\underline{\frac{e^{3x}}{27}(9x^2-15x+23) + C}}$$

$$\int xe^{-2x}\mathrm{d}x = \underline{\underline{-\frac{1}{4}e^{-2x}(2x+1) + C}}$$

$$\int (x^2+2x+17)e^{x}\mathrm{d}x = \underline{\underline{(x^2+17)e^{x} + C}}$$

$$\int x^2 3^x\mathrm{d}x = \underline{\underline{\frac{3^x}{\ln 3}(x^2 - \frac{2x}{\ln 3} + \frac{2}{\ln^2 3}) + C}}$$

$$\int \ln^2 x\mathrm{d}x = \begin{vmatrix} u' = 1 & v = \ln^2 x \\ u = x & v' = 2\ln x\frac{1}{x} \end{vmatrix} = x\ln^2 x - 2\int\ln x\mathrm{d}x = \begin{vmatrix} u' = 1 & v = \ln x \\ u = x & v' = \frac{1}{x} \end{vmatrix}$$

$$= \underline{\underline{x\ln^2 x - 2x\ln x + 2x + C}}$$

$$\int x\ln x\mathrm{d}x = \begin{vmatrix} u' = x & v = \ln x \\ u = \frac{x^2}{2} & v' = \frac{1}{x} \end{vmatrix} = \frac{x^2}{2}\ln x - \int\frac{x}{2}\mathrm{d}x = \underline{\underline{\frac{x^2}{2}\ln x - \frac{x^2}{4} + C}}$$

$$\int x^5\ln x\mathrm{d}x = \underline{\underline{\frac{x^6}{36}(6\ln x - 1) + C}}$$

$$\int x^2\ln x^3\mathrm{d}x = \underline{\underline{x^3\ln x - \frac{x^3}{3} + C}}$$

$$\int \ln 5x\mathrm{d}x = \underline{\underline{x\ln 5x - x + C}}$$

$$\int \frac{\ln x}{x^2}\mathrm{d}x = \underline{\underline{-\frac{1}{x}(\ln x + 1) + C}}$$

$$\int \sqrt{x}\ln x\mathrm{d}x = \underline{\underline{\frac{2}{3}\sqrt{x^3}(\ln x - \frac{2}{3}) + C}}$$

$$\int \mathrm{log} x\mathrm{d}x = \underline{\underline{x\mathrm{log} x - \frac{x}{\ln 10} + C}}$$

$$\int e^x\cos(2x)\mathrm{d}x = \begin{vmatrix} u' = e^x & v = \cos(2x) \\ u = e^x & v' = -2\sin(2x) \end{vmatrix} = e^x\cos(2x) + 2\int e^x\sin(2x)\mathrm{d}x =$$

$$= \begin{vmatrix} u' = e^x & v = \sin(2x) \\ u = e^x & v' = 2\cos(2x) \end{vmatrix} = e^x\cos(2x) + 2e^x\sin(2x) - 4\int e^x\cos(2x)\mathrm{d}x$$

$$\Rightarrow \int e^x\cos(2x)\mathrm{d}x = \underline{\underline{\frac{1}{5}(e^x\cos(2x) + 2e^x\sin(2x)) + C}}$$

$$\int e^x\sin(3x)\mathrm{d}x = \begin{vmatrix} u' = e^x & v = \sin(3x) \\ u = e^x & v' = 3\cos(3x) \end{vmatrix} = e^x\sin(3x) - 3\int e^x\cos(3x)\mathrm{d}x =$$

$$= \begin{vmatrix} u' = e^x & v = \cos(3x) \\ u = e^x & v' = -3\sin(3x) \end{vmatrix} = e^x\sin(3x) - 3\left(e^x\cos(3x) + 3\int e^x\sin(3x)\mathrm{d}x\right)$$

$$\Rightarrow \int e^x\sin(3x)\mathrm{d}x = \underline{\underline{\frac{1}{10}\left(e^x\sin(3x) - 3e^x\cos(3x)\right) + C}}$$

$$\int e^x\sin x\mathrm{d}x = \underline{\underline{\frac{1}{2}e^x(\sin x - \cos x) + C}}$$

$$\int e^{2x}\cos 5x\mathrm{d}x = \underline{\underline{\frac{e^2x}{29}(5\sin 5x + 2\cos 5x) + C}}$$

$$\int \sin^2 x\mathrm{d}x = \begin{vmatrix} u' = 1 & v = \sin^2 x \\ u = x & v' = 2\sin x\cos x = \sin(2x) \end{vmatrix} = x\sin^2 x - \int x\sin(2x)\mathrm{d}x = \begin{vmatrix} u' = \sin(2x) & v = x \\ u = -\frac{1}{2}\cos(2x) & v' = 1 \end{vmatrix}$$

$$= x\sin^2 x + \frac{1}{2}x\cos(2x) - \frac{1}{2}\int \cos(2x)\mathrm{d}x = x\sin^2 x + \frac{1}{2}x\cos(2x) - \frac{1}{4}\sin(2x) + C$$

$$= x\sin^2 x + \frac{1}{2}x(\cos^2 x - \sin^2 x) - \frac{1}{2}\sin x\cos x + C = \underline{\underline{\frac{1}{2}(x - \sin x\cos x) + C}}$$