

Metoda Per partes

- Spočtěte $\int x \cos x \, dx$.

$$\int x \cos x \, dx = \begin{array}{l} u(x)=x \\ v'(x)=\cos x \end{array} x \sin x - \int \sin x \, dx = x \sin x + \cos x + C.$$

$\begin{array}{l} u'(x)=1 \\ v(x)=\sin x \end{array}$

- Spočtěte $\int \log x \, dx$.

$$\int \log x \, dx = \begin{array}{l} u(x)=\log x \\ v'(x)=1 \end{array} x \log x - \int 1 \, dx = x \log x - x + C.$$

$\begin{array}{l} u'(x)=x^{-1} \\ v(x)=x \end{array}$

- Spočtěte $\int x \arctan x \, dx$.

$$\begin{aligned} \int x \arctan x \, dx &= \begin{array}{l} u(x)=\arctan x \\ v'(x)=x \end{array} \frac{1}{2} x^2 \arctan x - \frac{1}{2} \int \frac{x^2}{1+x^2} \, dx = \frac{1}{2} x^2 \arctan x - \frac{1}{2} \int \left(1 - \frac{1}{1+x^2}\right) \, dx = \\ &\quad \begin{array}{l} u'(x)=\frac{1}{1+x^2} \\ v(x)=\frac{1}{2}x^2 \end{array} \\ &= \frac{1}{2} x^2 \arctan x - \frac{1}{2} (x - \arctan x) + C = \frac{x^2}{2} \arctan x + \frac{1}{2} \arctan x - \frac{x}{2} + C. \end{aligned}$$