Metoda Per partes

- Spočtěte $\int x \cos x \, dx$.

$$\int x \cos x \, dx \underset{\substack{u(x)=x \\ v'(x)=\cos x \\ u'(x)=1 \\ v(x)=\sin x}}{=} x \sin x - \int \sin x \, dx = x \sin x + \cos x + C.$$

- Spočtěte $\int \log x \, dx$.

$$\int \log x \, dx \underset{\substack{u(x)=\log x \\ v'(x)=1 \\ u'(x)=x^{-1} \\ v(x)=x}}{=} x \log x - \int 1 dx = x \log x - x + C.$$

- Spočtěte $\int x \arctan x \, dx$.

$$\int x \arctan x \, dx \underset{\substack{u(x)=\arctan x \\ v'(x)=x \\ u'(x)=\frac{1}{1+x^2} \\ v(x)=\frac{1}{2}x^2}}{=} \frac{1}{2}x^2 \arctan x - \frac{1}{2}\int \frac{x^2}{1+x^2} dx = \frac{1}{2}x^2 \arctan x - \frac{1}{2}\int \left(1 - \frac{1}{1+x^2}\right) dx =$$

$$= \frac{1}{2}x^2 \arctan x - \frac{1}{2}\left(x - \arctan x\right) + C = \frac{x^2}{2} \arctan x + \frac{1}{2} \arctan x - \frac{x}{2} + C.$$