

1 Neurčitý integrál

1.1 Základní vzorce (platí na definičním oboru integrované funkce)

$$\int c \, dx = cx + C; k \in \mathbb{R} \quad \text{speciálně} \quad \int 1 \, dx = x + C \quad (1)$$

$$\int x^n \, dx = \frac{x^{n+1}}{n+1} + C \quad \text{pro } x > 0, n \in \mathbb{R}, n \neq -1 \quad (2)$$

$$\int \frac{1}{x} \, dx = \ln |x| + C \quad \text{pro } x \neq 0 \quad (3)$$

$$\int e^x \, dx = e^x + C \quad (4)$$

$$\int a^x \, dx = \frac{a^x}{\ln a} + C \quad \text{pro } a > 0, a \neq 1 \quad (5)$$

$$\int \sin x \, dx = -\cos x + C \quad (6)$$

$$\int \cos x \, dx = \sin x + C \quad (7)$$

$$\int \frac{1}{\cos^2 x} \, dx = \operatorname{tg} x + C \quad \text{pro } x \neq \frac{\pi}{2} + k\pi, k \in \mathbb{Z} \quad (8)$$

$$\int \frac{1}{\sin^2 x} \, dx = -\operatorname{cotg} x + C \quad \text{pro } x \neq k\pi, k \in \mathbb{Z} \quad (9)$$

$$\int \frac{f'(x)}{f(x)} \, dx = \ln |f(x)| + C \quad (10)$$

1.2 Operace s integrály

$$\int c \cdot f(x) \, dx = c \cdot \int f(x) \, dx = c \cdot F(x) + C \quad (11)$$

$$\int (f(x) \pm g(x)) \, dx = \int f(x) \, dx \pm \int g(x) \, dx = F(x) \pm G(x) + C \quad (12)$$

1.3 Per partes

$$\int u(x) \cdot v'(x) \, dx = u(x) \cdot v(x) - \int u'(x) \cdot v(x) \, dx \quad (13)$$

$$\int u'(x) \cdot v(x) \, dx = u(x) \cdot v(x) - \int u(x) \cdot v'(x) \, dx \quad (14)$$

1.4 Substitute

$$\int \underbrace{f(g(x))}_{f(t)} \cdot \underbrace{g'(x) \, dx}_{dt} = \left| \begin{array}{l} t = g(x) \\ dt = g'(x) \, dx \end{array} \right| = \int f(t) \, dt = \underbrace{F(t)}_{F(g(x))} + C \quad (15)$$