

## Note on arcctg x derivative

$$y = \operatorname{ctg} x \quad (1)$$

$$x = \operatorname{arcctg} y \quad (2)$$

$$\begin{aligned} \frac{dy}{dx} &= \frac{d \operatorname{ctg} x}{dx} = \frac{d}{dx} \left( \frac{\cos x}{\sin x} \right) = \frac{-\sin^2 x - \cos^2 x}{\sin^2 x} = \frac{-1 - \operatorname{ctg}^2 x}{1} \\ &= -\frac{\operatorname{ctg}^2 x + 1}{1} \end{aligned} \quad (3)$$

$$\frac{dy}{dx} = -\frac{y^2 + 1}{1} \quad (4)$$

$$\frac{dx}{dy} = \frac{d \operatorname{arcctg} y}{dy} = -\frac{1}{y^2 + 1} \quad (5)$$

$$\frac{d \operatorname{arcctg} x}{dx} = -\frac{1}{x^2 + 1} \quad (6)$$

Pawel Jan Piskorz (paweljs@gmail.com)