

$$\lim_{x \rightarrow 0} \frac{\sin x - x}{x^2} = 0$$

$$\underline{x \rightarrow 0^+}$$

$$0 \leq \sin x \leq x \leq \tan x$$

$$0 \leq x - \sin x \leq \tan x - \sin x$$

$$0 \leq \overset{\rightarrow 0}{\frac{x - \sin x}{x^2}} \leq \overset{\rightarrow 0}{\frac{\tan x - \sin x}{x^2}}$$

$$\frac{\tan x - \sin x}{x^2} = \overset{\rightarrow 0}{\tan x} \overset{\rightarrow 1/2}{\frac{1 - \cos x}{x^2}} \rightarrow 0$$

$$\leadsto \frac{\sin x - x}{x^2} \rightarrow 0 \quad x \rightarrow 0^+$$

$$\underline{x \rightarrow 0^-} \quad \frac{\sin x - x}{x^2} = \frac{-\sin(-x) + (-x)}{x^2} = -\frac{\sin y - y}{y^2} \rightarrow 0$$

$$\leadsto \frac{\sin x - x}{x^2} \rightarrow 0 \quad x \rightarrow 0$$

$$\sin x - x = o(x^2)$$