

$$\begin{aligned}(3) \quad \lim_{x \rightarrow +0} \frac{x \log x}{\cot x} &= \lim_{x \rightarrow +0} \frac{x \log x}{1/\tan x} \\&= \lim_{x \rightarrow +0} \tan x \frac{\log x}{1/x} = \lim_{x \rightarrow +0} \tan x \cdot \lim_{x \rightarrow +0} \frac{\log x}{1/x} \\&= \lim_{x \rightarrow +0} \tan x \cdot \lim_{x \rightarrow +0} \frac{1/x}{-1/x^2} = 0\end{aligned}$$