3) $(f_n)_{n\geq 1}$; $f_n(x) = x \text{ arctg}(nx)$ converge uniform on $I=[0,\infty)$

$S: \sum_{n\geq 1} f_n$; $f_n : I \to \mathbb{R}$ is uniform convergent on his crowd convergence $I \iff (\forall)\, \varepsilon > 0,\ \exists N(\varepsilon) > 0$ s.t. $\forall\, n > N(\varepsilon)$;
$(\forall)\, x \in I \Rightarrow |f_{n+1}(x) + f_{n+2}(x) + \dots + f_{n+p}(x)| < \varepsilon$, where $p \in \mathbb{N}$ and $p = 1$

s.t $(\forall)\, n > N(\varepsilon)$

$$\left.\begin{array}{l} |f_{n+1}(x)| < \varepsilon \end{array}\right\} \Rightarrow \left.\begin{array}{l} |x \text{ arctg}(nx)| < \varepsilon \\ x \in [0,\infty) \end{array}\right\} \Rightarrow |\text{arctg}\, x(nx)| < \frac{\varepsilon}{x}$$

$$\Rightarrow \text{arctg}\, nx < \frac{\varepsilon}{x} \Rightarrow nx < tg\frac{\varepsilon}{x} \Rightarrow n < \frac{tg\frac{\varepsilon}{x}}{x}$$

$$N(\varepsilon) = \left[\frac{tg\frac{\varepsilon}{x}}{x}\right] + 1$$