15. $\Omega = (0,1)$

$\varphi \in \mathcal{D}(\Omega)$

$$\langle T, \varphi \rangle = \sum_{n=1}^{\infty} \varphi^{(n)}\left(\frac{1}{n}\right)$$

<u>Lineal</u>: Sean $a, b \in \mathbb{R}$, $\varphi, \psi \in \mathcal{D}(\Omega)$

$$\langle T, a\varphi + b\psi \rangle = \sum_{n=1}^{\infty} \frac{d^n}{dx^n}(a\varphi(x) + b\psi(x))\Big|_{x=1/n}$$

$$= \sum_{n=1}^{\infty} \left[a\varphi^{(n)}(1/n) + b\psi^{(n)}(1/n)\right]$$

$$= a\sum_{n=1}^{\infty} \varphi^{(n)}(1/n) + b\sum_{n=1}^{\infty} \psi^{(n)}(1/n)$$

$$= a\langle T, \varphi \rangle + b\langle T, \psi \rangle$$

<u>Continuo</u>: Sea $K \subset \Omega$ compacto

Sea $\varphi \in \mathcal{D}_K(\Omega)$

$$|\langle T, \varphi \rangle| = \left|\sum_{n=0}^{\infty} \varphi^{(n)}(1/n)\right|$$

$$\leq \sum_{n=0}^{\infty} |\varphi^{(n)}(1/n)|$$

$$\leq \sum_{n=0}^{\infty} \sup_{x \in K} |\varphi^{(n)}(x)|$$

Luego, $T$ es continuo con $C_K = 1$ y $m = \infty$.

Luego, $T$ es distribución de orden infinito