

- Generalize the function derivative formula to tempered dist.

$$\langle \mathcal{F} \mathcal{T}', \varphi \rangle = \langle \mathcal{T}', \mathcal{F} \varphi \rangle = - \langle \mathcal{T}, (\mathcal{F} \varphi)' \rangle$$

$$= - \langle \mathcal{T}, \mathcal{F}[-2\pi i t \varphi] \rangle$$

$$= - \langle \mathcal{F} \mathcal{T}, -2\pi i t \varphi \rangle$$

$$\langle 2\pi i t \mathcal{F} \mathcal{T}, \varphi \rangle$$

$$\Rightarrow \mathcal{F} \mathcal{T}' = -2\pi i x \mathcal{F} \mathcal{T}$$