## Translation Equivarient Pointwise 1D Convolution Layer (TEPC)

Discrete Fourier Transform

$$\hat{X} = FFT(X)$$

Calculate Phase

$$\phi = arg(\hat{X}^{(1)})$$

Phase Align

$$\widehat{X}' = \widehat{X} \cdot e^{-i \phi K_{in}}$$

Complex Linear

$$\widehat{Y}' = W * \widehat{X}'$$

Shift Phase Back

$$\hat{Y} = \hat{Y}' \cdot e^{i \phi K_{out}}$$

**Inverse Fourier Transform** 

$$Y = IFFT(\hat{Y})$$



