$$\left(\hat{x}(\omega) = \int_{\mathbb{R}} x(t)\, \mathrm{e}^{-\mathrm{j}\,\omega\,t}\, \mathrm{d}t = \frac{1}{K} \sum_{n=0}^{K-1} X[n]\, \mathrm{e}^{\mathrm{j}\,\frac{1}{2}\left(\omega - n\,\frac{2\,\pi}{K}\right)}\, \varphi_n(\omega) \right)$$