Periodization $f_0(t) \mapsto \sum_n f_0(t+n)$

Sampling $f[n] = f_0(n/N)$

$f_0(t), t \in \mathbb{R}$	$f_0(t), t \in [0,1]$	Continuous
$f[n], n \in \mathbb{Z}$	$f[n], 0 \leqslant n < N$	Discrete
Infinite	Periodic	

Fourier transform

Isometry $f \mapsto \hat{f}$

Sampling $\hat{f}_0(\omega) \mapsto \{\hat{f}_0(k)\}_k$

Periodization $\hat{f}(\omega) = \sum_k \hat{f}_0(N(\omega + 2k\pi))$

$\hat{f}_0(\omega), \omega \in \mathbb{R}$	$\hat{f}_0[k], k \in \mathbb{Z}$	Infinite
$\hat{f}(\omega), \omega \in [0, 2\pi]$	$\hat{f}[k], 0 \leqslant k < N$	Periodic
Continuous	Discrete	