

3.33 Determine the periodic sequence $\tilde{y}[n]$ obtained by a periodic convolution of the following two periodic sequences of period 5 each:

$$\tilde{x}[n] = \begin{cases} 2 & , \text{ for } n = 0, 2 \\ -1 & , \text{ for } n = 1 \\ 3 & , \text{ for } n = 3 \\ -2 & , \text{ for } n = 4 \end{cases} \quad \tilde{h}[n] = \begin{cases} 1 & , \text{ for } n = 0 \\ 2 & , \text{ for } n = 1 \\ -3 & , \text{ for } n = 2, 4 \\ 0 & , \text{ for } n = 3 \end{cases}$$

3.39 Prove the following general properties of the DFT listed below.

- (a) Linearity
- (b) Circular time-shifting
- (c) N -point Circular Convolution

Type of Property	Length- N Sequence	N -point DFT
	$g[n]$	$G[k]$
	$h[n]$	$H[k]$
Linearity	$\alpha g[n] + \beta h[n]$	$\alpha G[k] + \beta H[k]$
Circular time-shifting	$g[\langle n - n_0 \rangle_N]$	$W_N^{kn_0} G[k]$
N -point circular convolution	$\sum_{m=0}^{N-1} g[m] h[\langle n - m \rangle_N]$	$G[k] H[k]$

原 PDF 中 3.48~3.54 无误，请参考之。