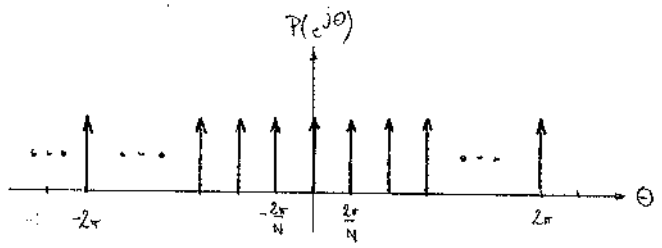
A 3.5

(a) $p_z[n] = \sum_{k=-\infty}^{\infty} \delta[n-kN] \circ\!\!-\!\!\bullet P(e^{j\Theta}) = \frac{2\pi}{N} \sum_{k=-\infty}^{\infty} \delta\left(\Theta - \frac{2\pi}{N}k\right) = \frac{2\pi}{N}\, \delta_{\frac{2\pi}{N}}(\Theta)$

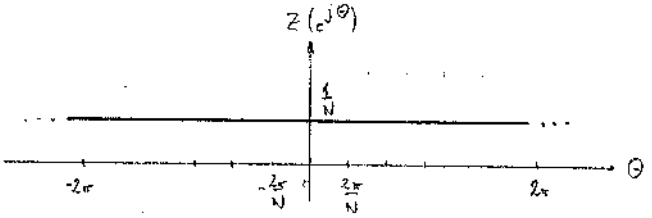


$z[n] = x[n] \cdot p_z[n]$

$X(e^{j\Theta}) = \text{rect}_{2\pi}\left(\frac{\Theta}{\frac{2\pi}{N}}\right) \circ\!\!-\!\!\bullet x[n] = \frac{\sin\left(\frac{\pi}{N}n\right)}{\pi n}$

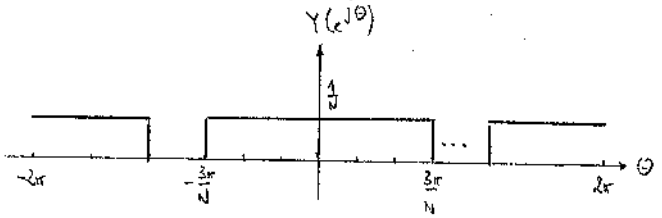
$z[n] = \sum_{k=-\infty}^{\infty} \delta[n-kN] \cdot \frac{\sin\left(\frac{\pi}{N}n\right)}{\pi n} = \delta[n]\, \frac{\sin\left(\frac{\pi}{N}n\right)}{\pi n} = \frac{1}{N}\, \delta[n]$

$Z(e^{j\Theta}) = \frac{1}{N}$



$y[n] = (z * h_{TP})[n] \circ\!\!-\!\!\bullet Z(e^{j\Theta}) \cdot H_{TP}(e^{j\Theta}) = Y(e^{j\Theta})$

$Y(e^{j\Theta}) = \frac{1}{N}\, \text{rect}_{2\pi}\left(\frac{\Theta}{\frac{6\pi}{N}}\right)$



(b) $y[n] = \frac{1}{N}\, \frac{\sin\left(\frac{3\pi}{N}n\right)}{\pi n}$