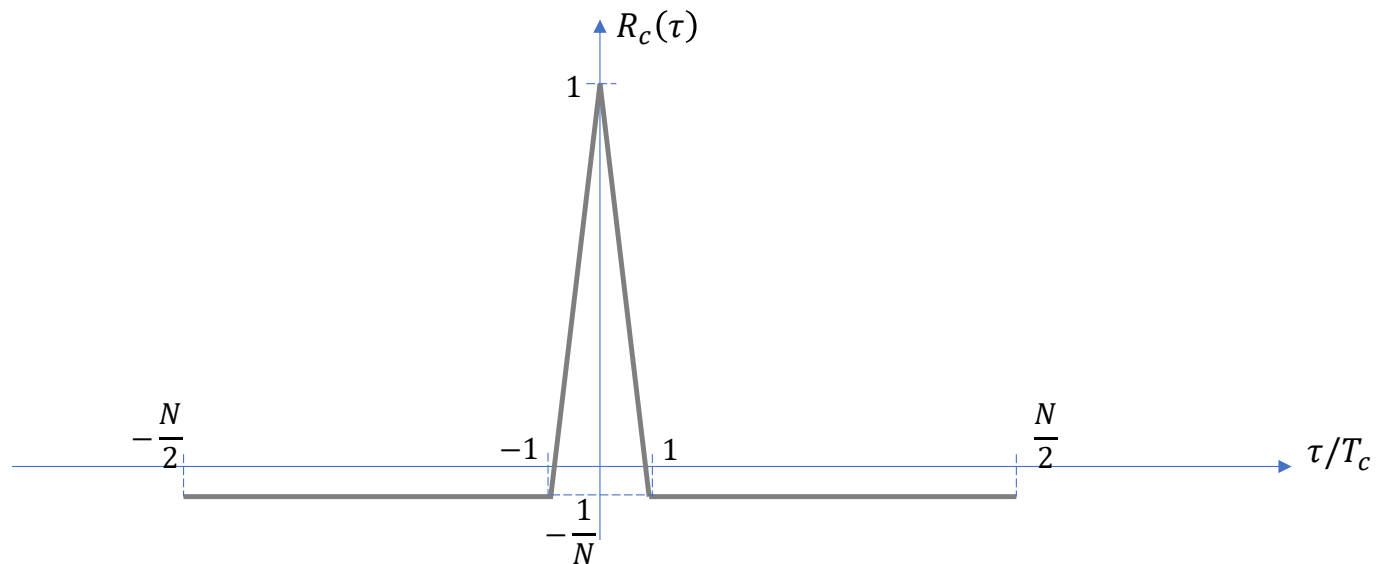


Channel estimation via maximum-length sequences

EE161: Digital Communication Systems
San José State University

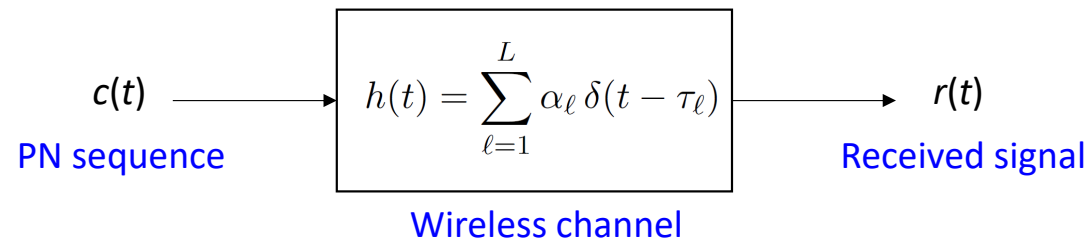
Maximum-length (or pseudo-noise, **PN**) sequence

- A **PN** sequence is a BPSK rectangular-pulse sequence $c(t)$ of length $T = NT_c$ with good (“peaky”) autocorrelation:



See lecture note [16_1_note_PNsequence.pdf](#) and section 15.4 of the textbook

Channel estimation using a PN sequence



(Cross-) Correlation between input $c(t)$ and output $r(t)$:

$$R_{cr}(\tau) = h(\tau) \star R_c(\tau) = \sum_{\ell=1}^L \alpha_{\ell} R_c(t - \tau_{\ell})$$

The receiver uses $c(t)$ to compute the correlation with the received signal and uses peak detection to estimate the channel

Example: Estimation of a two-path channel

