

- $Y(t) = X'(t) + Z'(t)$
- $X'(t)$ and $Z'(t)$ are filtered versions of $X(t)$ and $Z(t)$, respectively.
- Both $X'(t)$ and $Z'(t)$ are bandlimited to $[0, W]$.
- $Z'(t)$ is a bandlimited white Gaussian noise with

$$S_{Z'}(f) = \begin{cases} N_0/2 & -W \leq f \leq W \\ 0 & \text{otherwise.} \end{cases}$$

- Regard $X'(t)$ as the channel input and $Z'(t)$ as the additive noise process.
- Impose a suitable power constraint on $X'(t)$.