

For a white Gaussian channel

- bandlimited to $[f_l, f_h]$, where f_l is a multiple of $W' = f_h - f_l$;
- noise level = $\frac{N_0}{2}$;
- power constraint = P ;

the capacity is

$$W' \log \left(1 + \frac{P}{N_o W'} \right).$$

Here, $W' = \Delta_k$, $P = P_i$, and $\frac{N_0}{2} = S_{Z,i}$, or $N_0 = 2S_{Z,i}$.