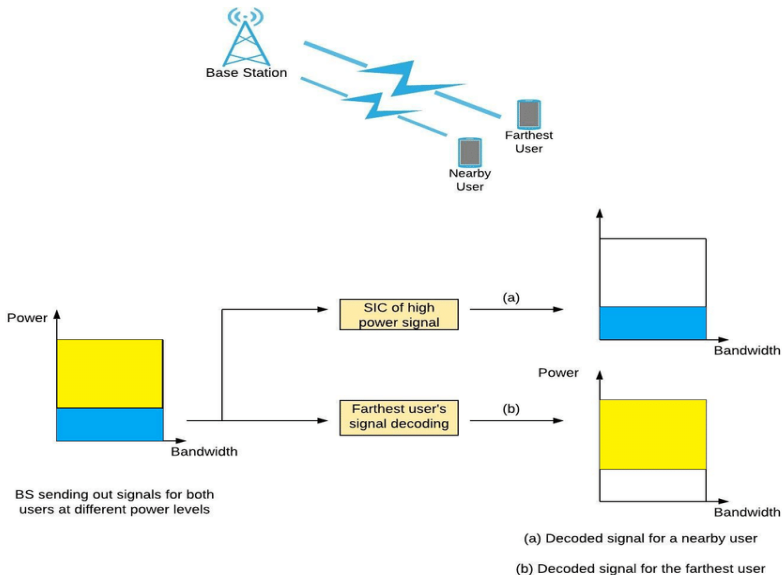


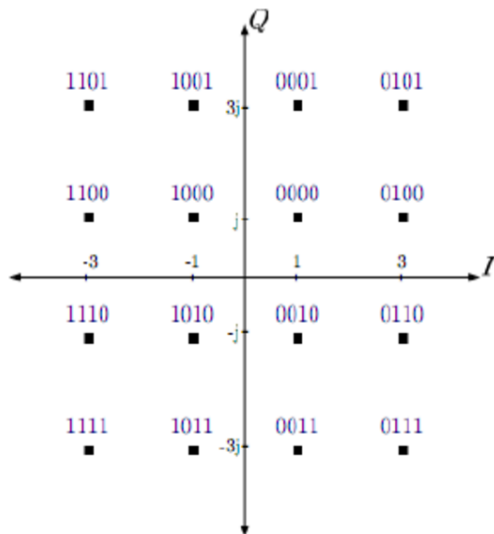
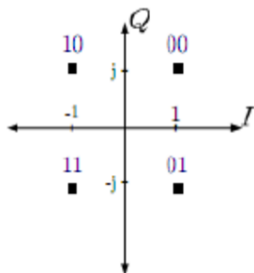
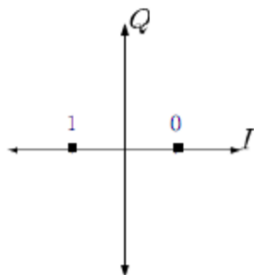
BER for dual user NOMA using QAM

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NOMA

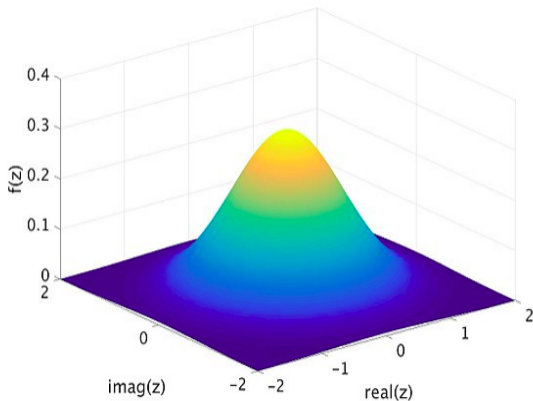


QAM symbol for U_1 and U_2



AWGN channel

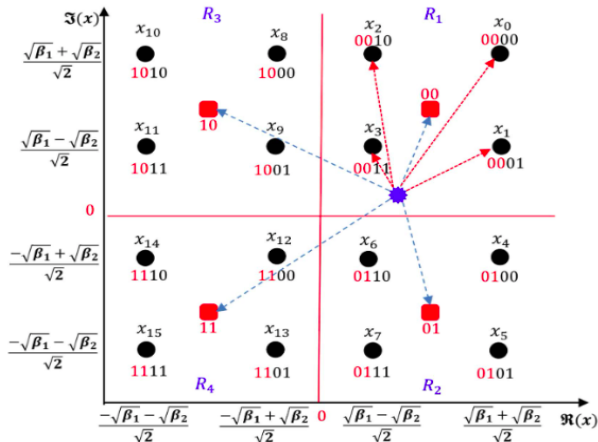
Channel that adds noise to each transmitted symbol. The noise is complex normal $\sim \text{CN}(0, N_o)$



NOMA symbol

$$\text{Transmitted symbol}(x) = \sqrt{\beta_1 P_T} s_1 + \sqrt{\beta_2 P_T} s_2 \quad (1)$$

$$\text{Received symbol}(\hat{x}) = h_n(\sqrt{\beta_1 P_T} s_1 + \sqrt{\beta_2 P_T} s_2) + CN(0, N_o) \quad (2)$$



BER for U_1

$$P_{b_{1i}} = \frac{1}{\sqrt{M_1 M_2}} \sum_{j=0}^{\frac{1}{2}(\sqrt{M_1}-1)} \sum_{k=0}^{\frac{1}{2}(\sqrt{M_2}-1)} D_1(i, j) \times Q \left(\frac{h_1}{\sqrt{N_o}} \left[(2j+1)\sqrt{\beta_1 P_T} + (2k - \sqrt{M_2} + 1)\sqrt{\beta_2 P_T} \right] \right) \quad (3)$$

$$D_1(i, j) = (-1)^{\left\lfloor \frac{j2^{i-1}}{\sqrt{M_1}} \right\rfloor} \left(2^{i-1} - \left\lfloor \frac{j2^{i-1}}{\sqrt{M_1}} + \frac{1}{2} \right\rfloor \right) \quad (4)$$

$$BER = \frac{2}{\log_2 \sqrt{M_1}} \sum_{i=1}^{\log_2 \sqrt{M_1}} P_{b_{1i}} \quad (5)$$

Results

