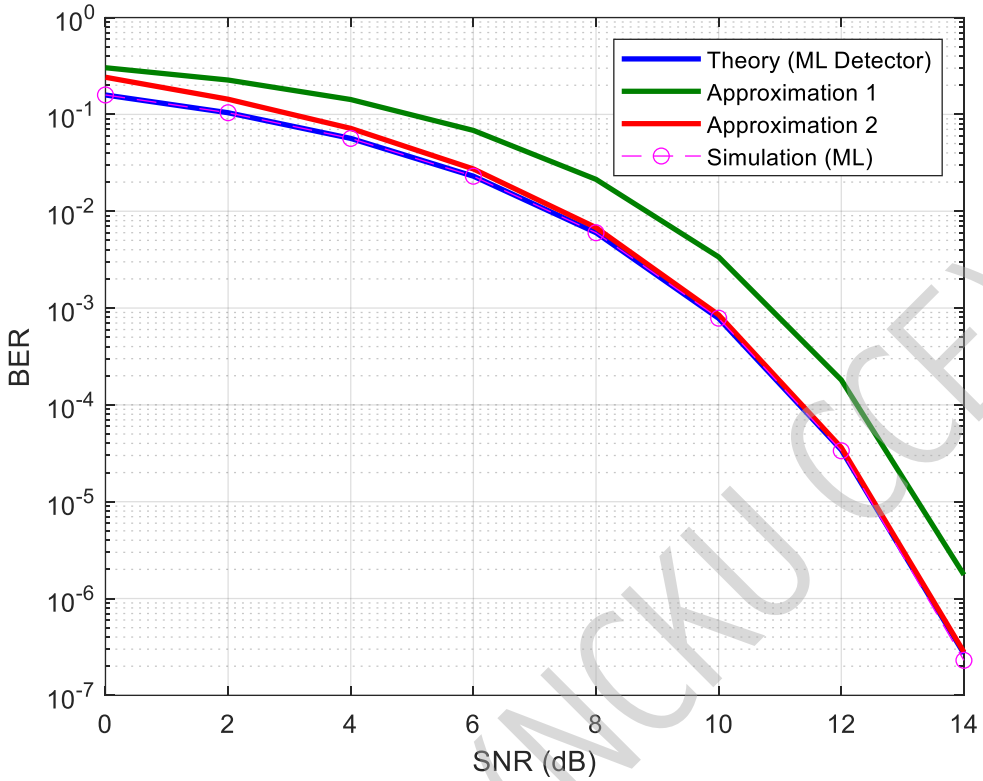
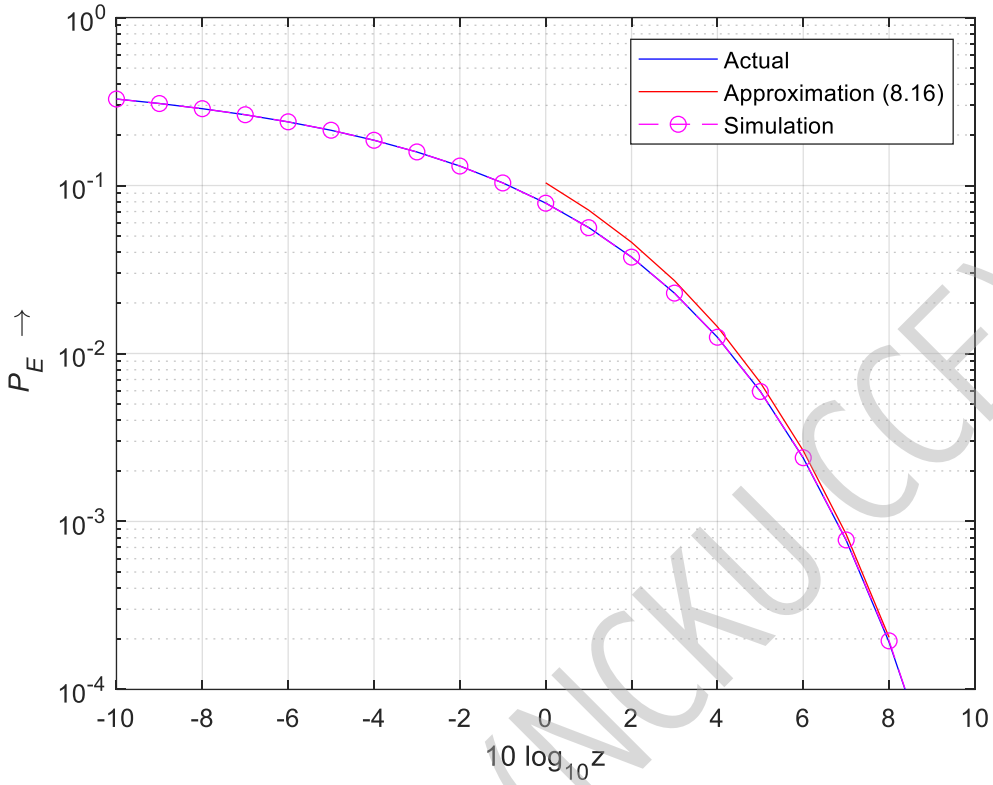
Appendix 1

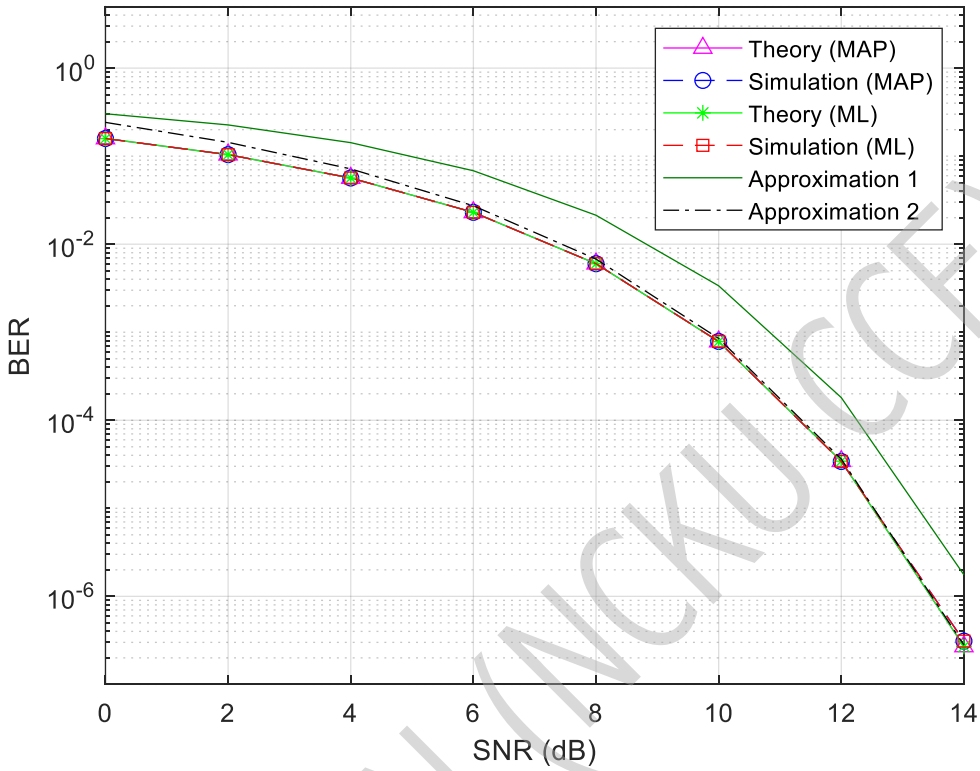


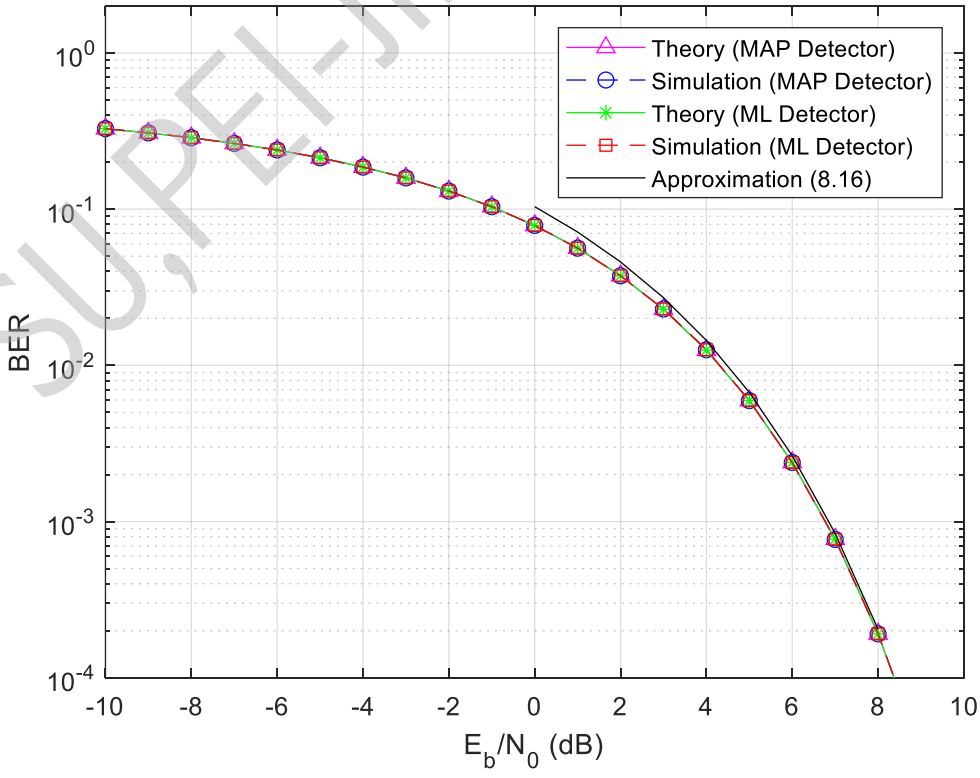
Appendix 2



Equal probability of the transmitted bits

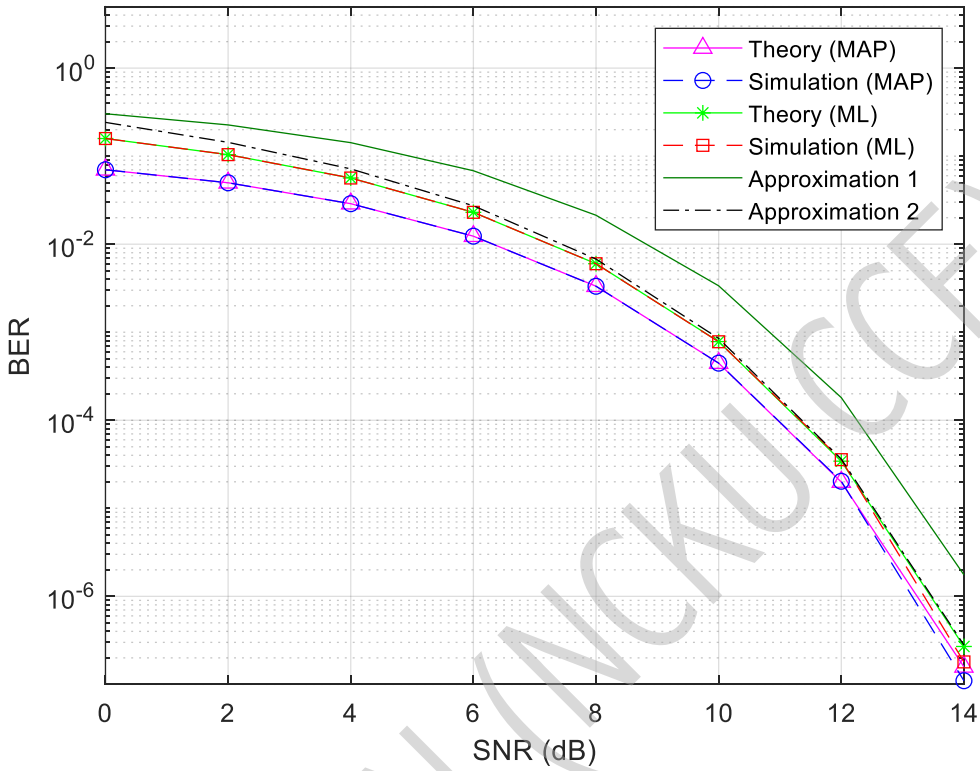
$P(1) = P(s = \sqrt{2}) = P_1 = 0.5$ and $P(0) = P(s = -\sqrt{2}) = 1 - P_1 = 0.5$

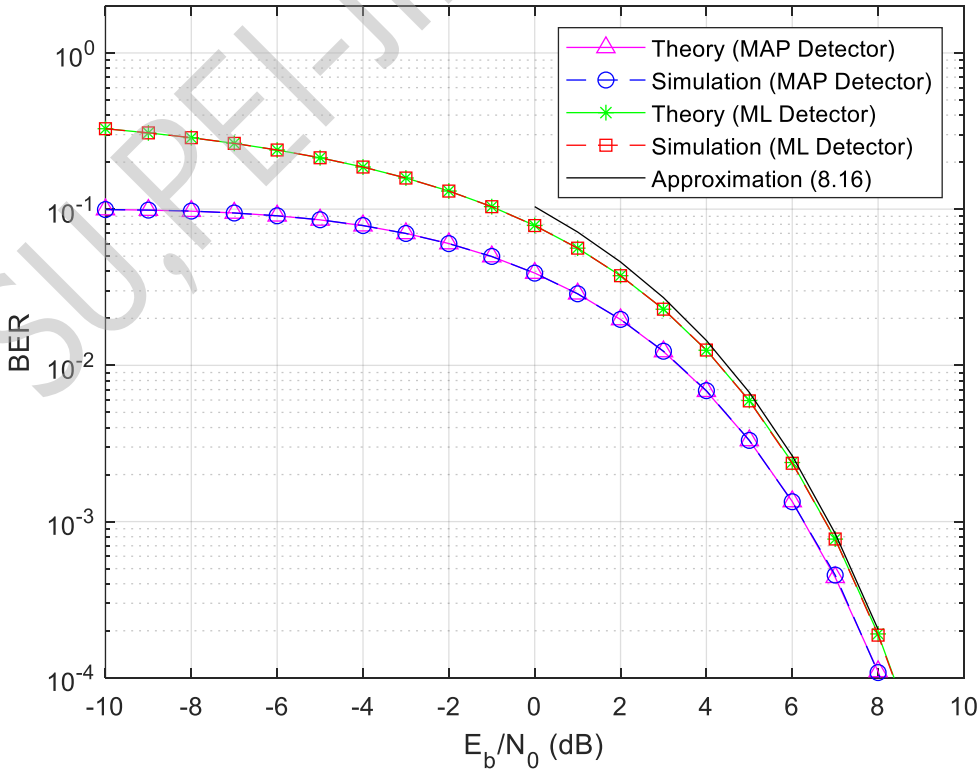




Non-equal probability of the transmitted bits

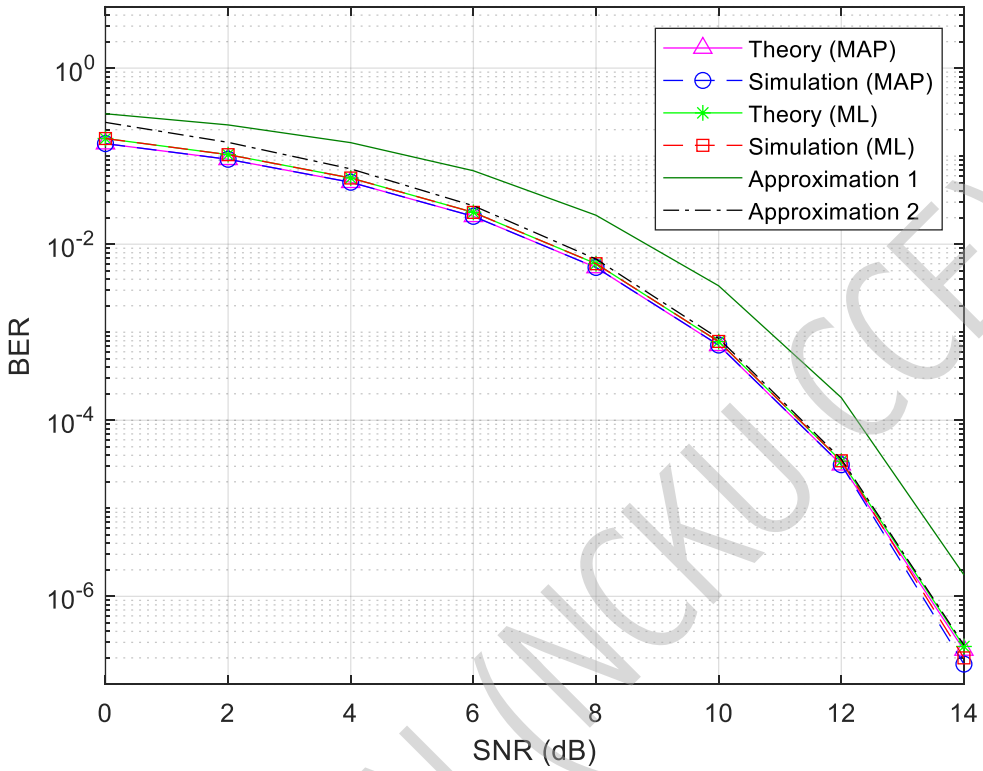
$P(1) = P\left(s = \sqrt{2}\right) = P_1 = 0.1$ and $P(0) = P\left(s = -\sqrt{2}\right) = 1 - P_1 = 0.9$

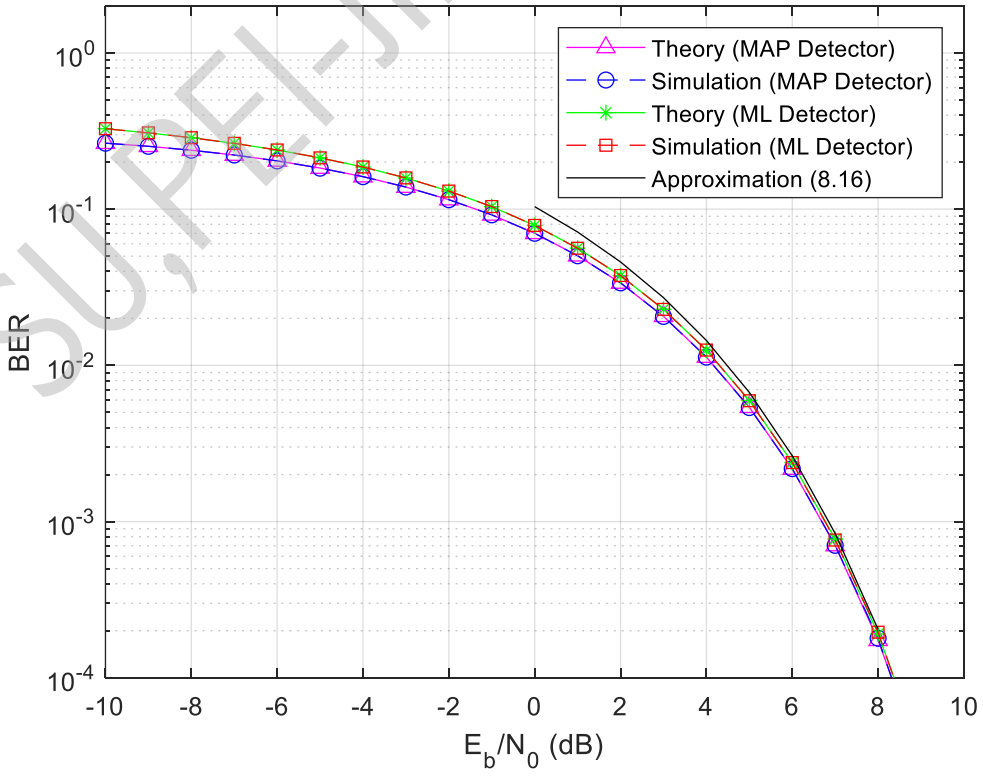




Non-equal probability of the transmitted bits

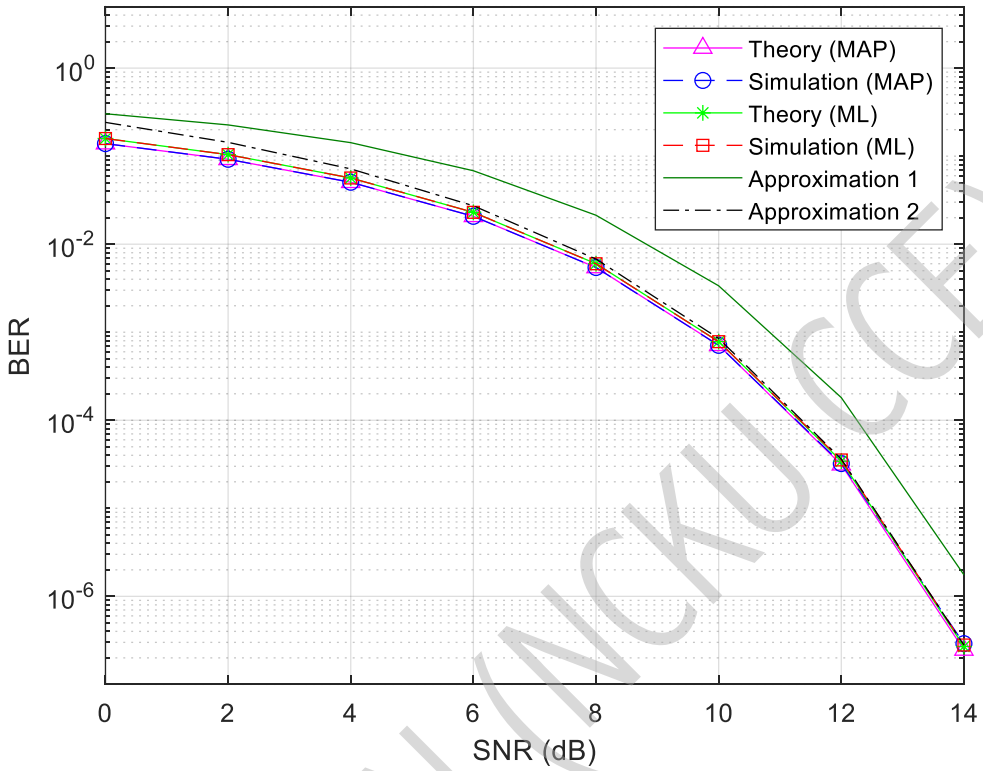
$P(1) = P\left(s = \sqrt{2}\right) = P_1 = 0.3$ and $P(0) = P\left(s = -\sqrt{2}\right) = 1 - P_1 = 0.7$

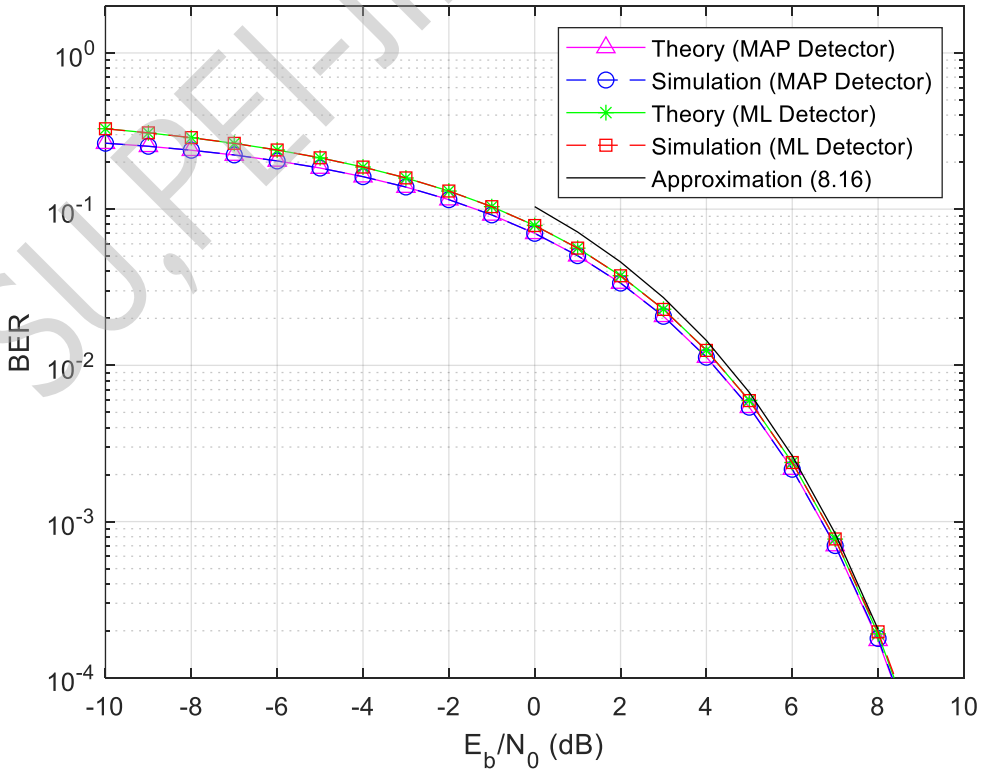




Non-equal probability of the transmitted bits

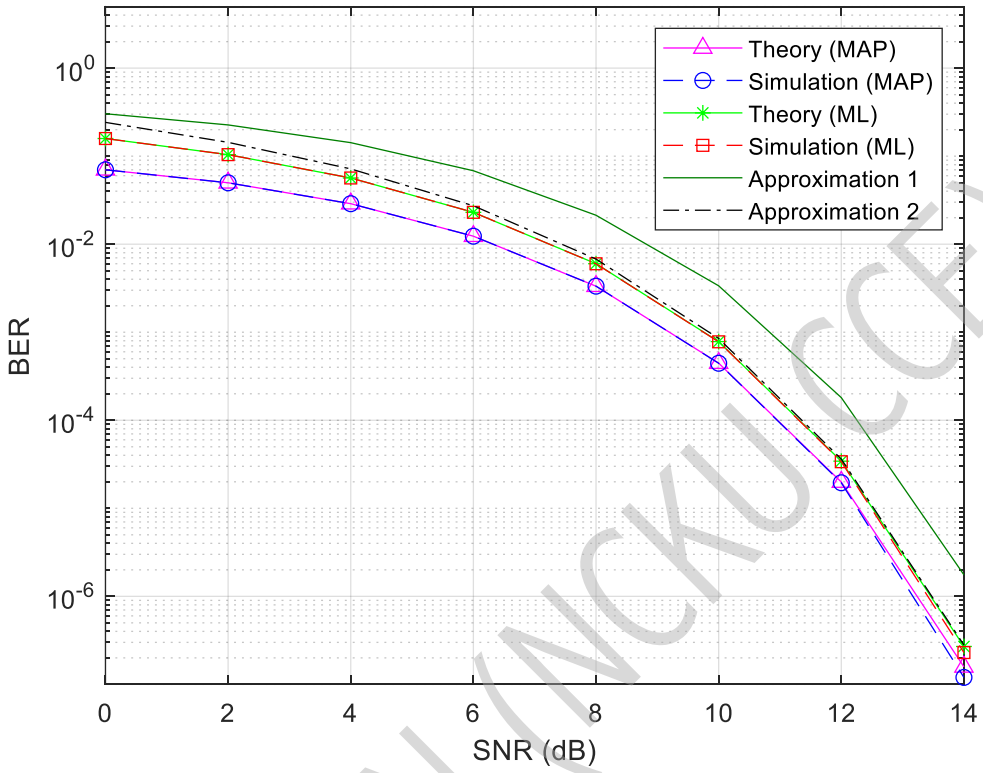
$P(1) = P\left(s = \sqrt{2}\right) = P_1 = 0.7$ and $P(0) = P\left(s = -\sqrt{2}\right) = 1 - P_1 = 0.3$

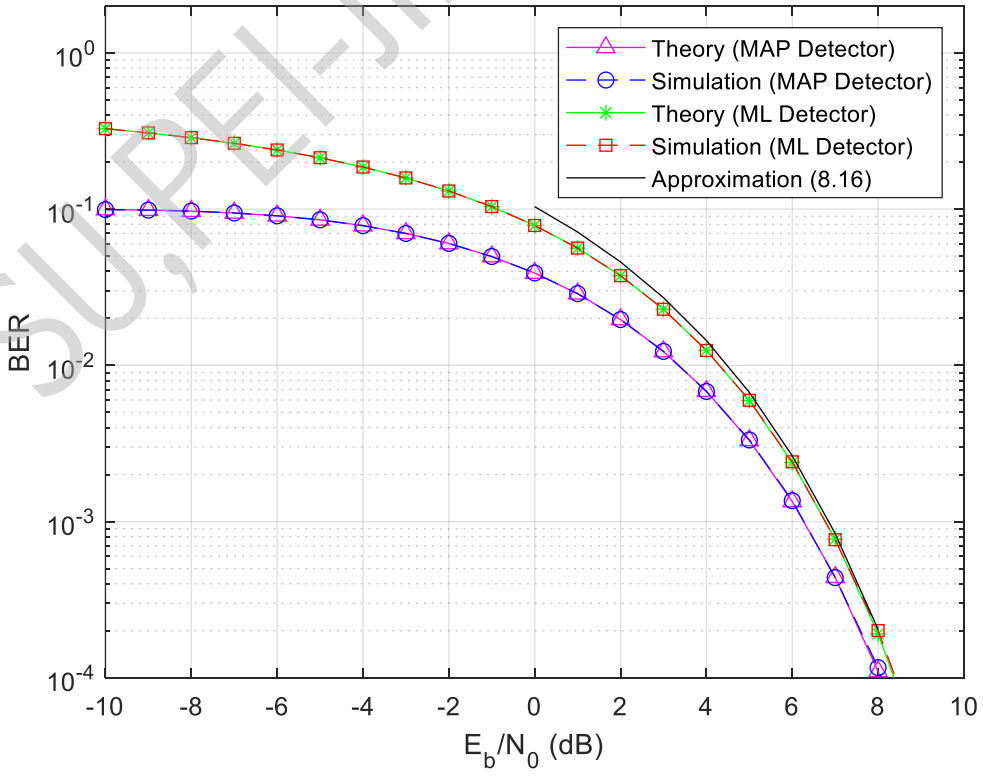




Non-equal probability of the transmitted bits

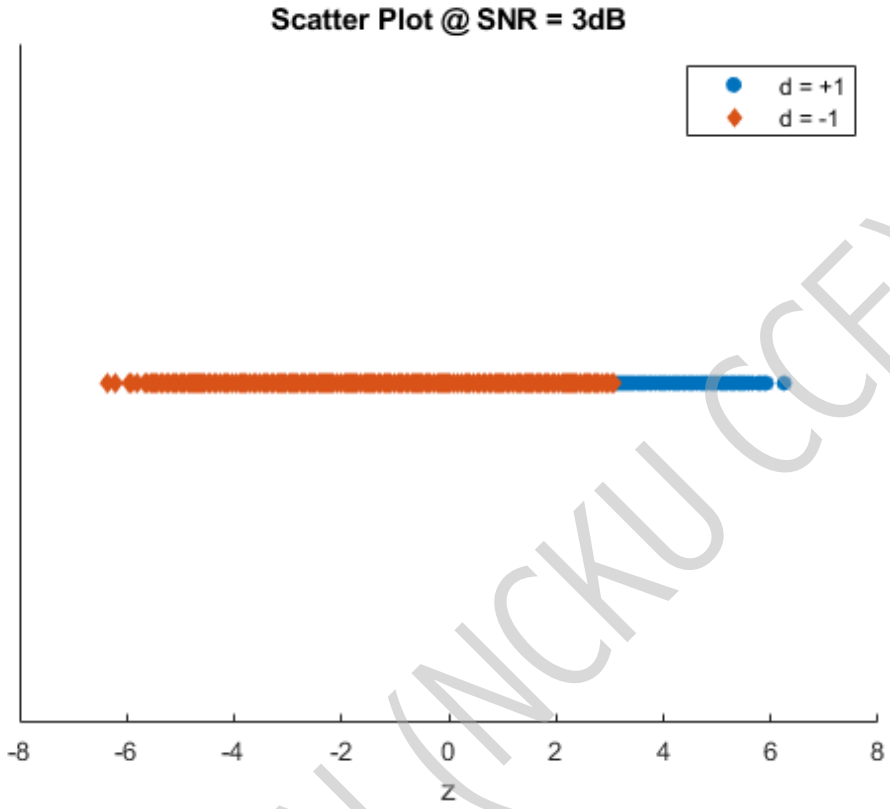
$P(1) = P\left(s = \sqrt{2}\right) = P_1 = 0.9$ and $P(0) = P\left(s = -\sqrt{2}\right) = 1 - P_1 = 0.1$

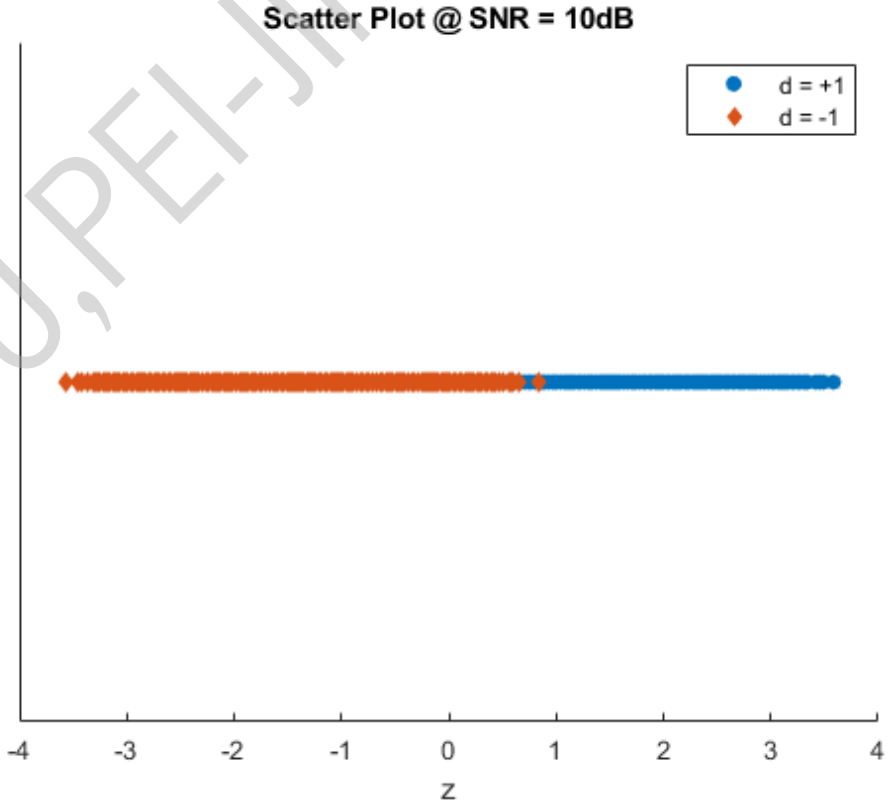




Scatter Plot @ SNR = 3dB & SNR = 10dB

$$\text{SNR} = 3\text{dB} \Longrightarrow N_0 \approx 1.0024 \qquad \text{and} \qquad \text{SNR} = 10\text{dB} \Longrightarrow N_0 \approx 0.2$$





Histogram @ SNR = 3dB & SNR = 10dB

$\text{SNR} = 3\text{dB} \Longrightarrow N_0 \approx 1.0024$ and $\text{SNR} = 10\text{dB} \Longrightarrow N_0 \approx 0.2$