Solution of Homework # 10

1. Error floors with OFDM transmission

   MATLAB simulation results:

Montecarlo simulation of OFDM with QPSK modulation over a multipath channel
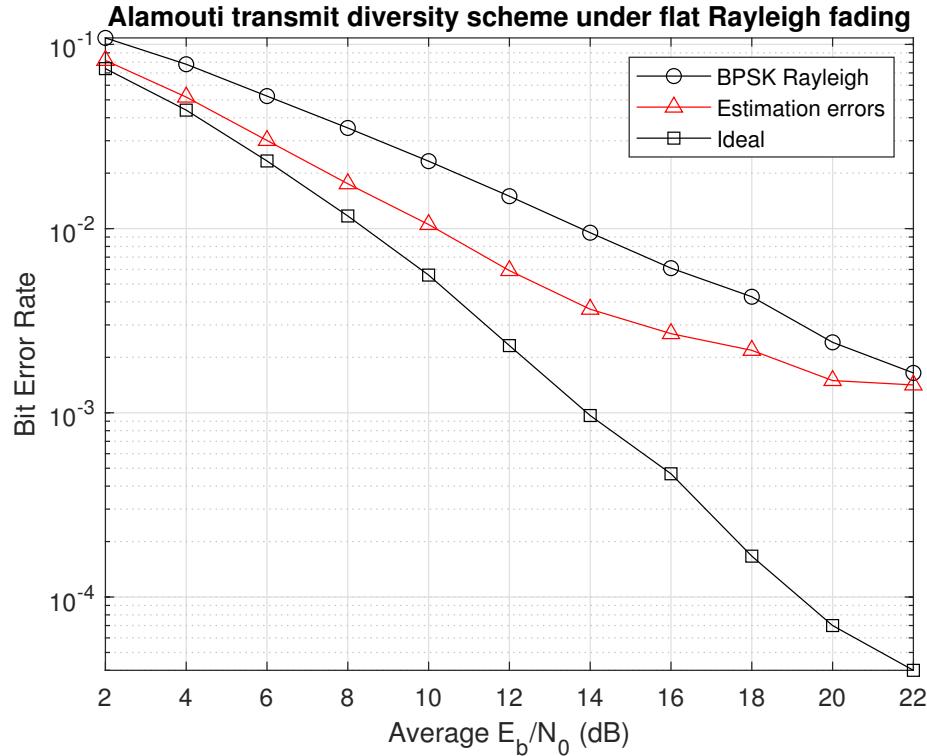
As expected, the higher the number of subcarriers the lower the errors floor is.
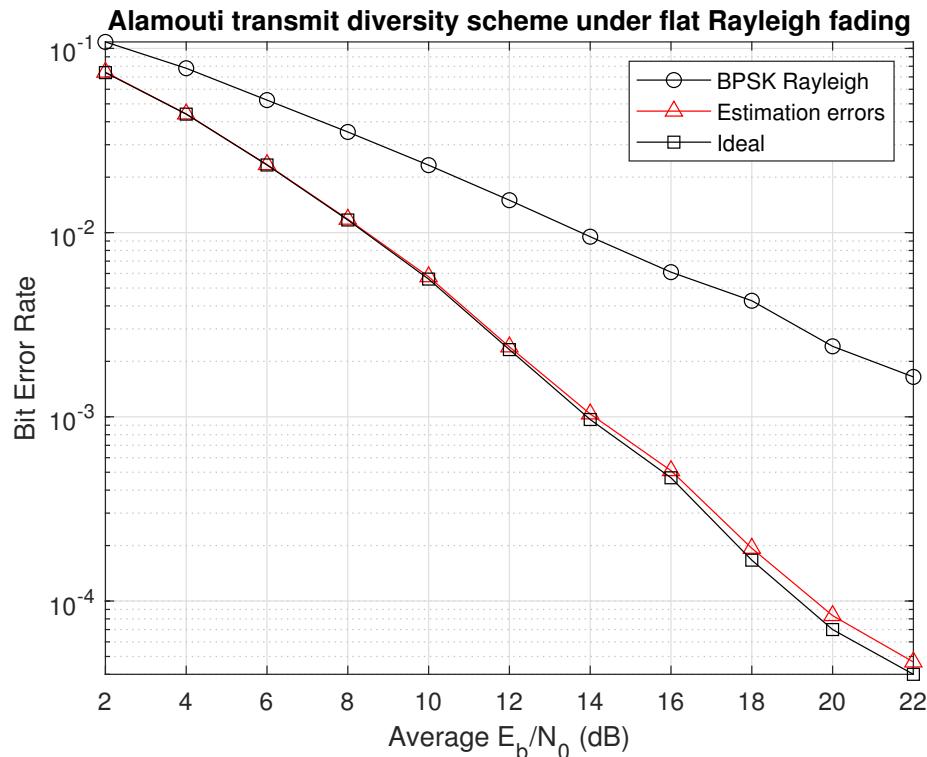
2.

3. Channel estimation errors in Alamouti's scheme
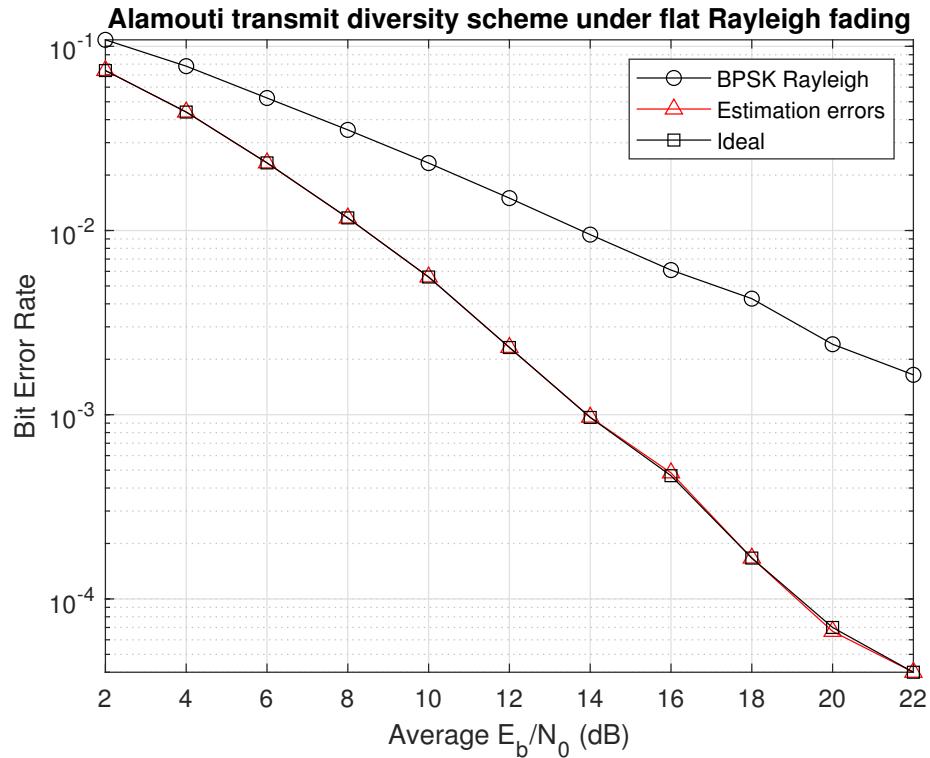
(i) $\sigma_e = 0.2$: Diversity is completely lost and an error floor is observed.

Alamouti transmit diversity scheme under flat Rayleigh fading

(ii) $\sigma_e = 0.03$: There is a slight lost of diversity but still very close to 2.

Alamouti transmit diversity scheme under flat Rayleigh fading
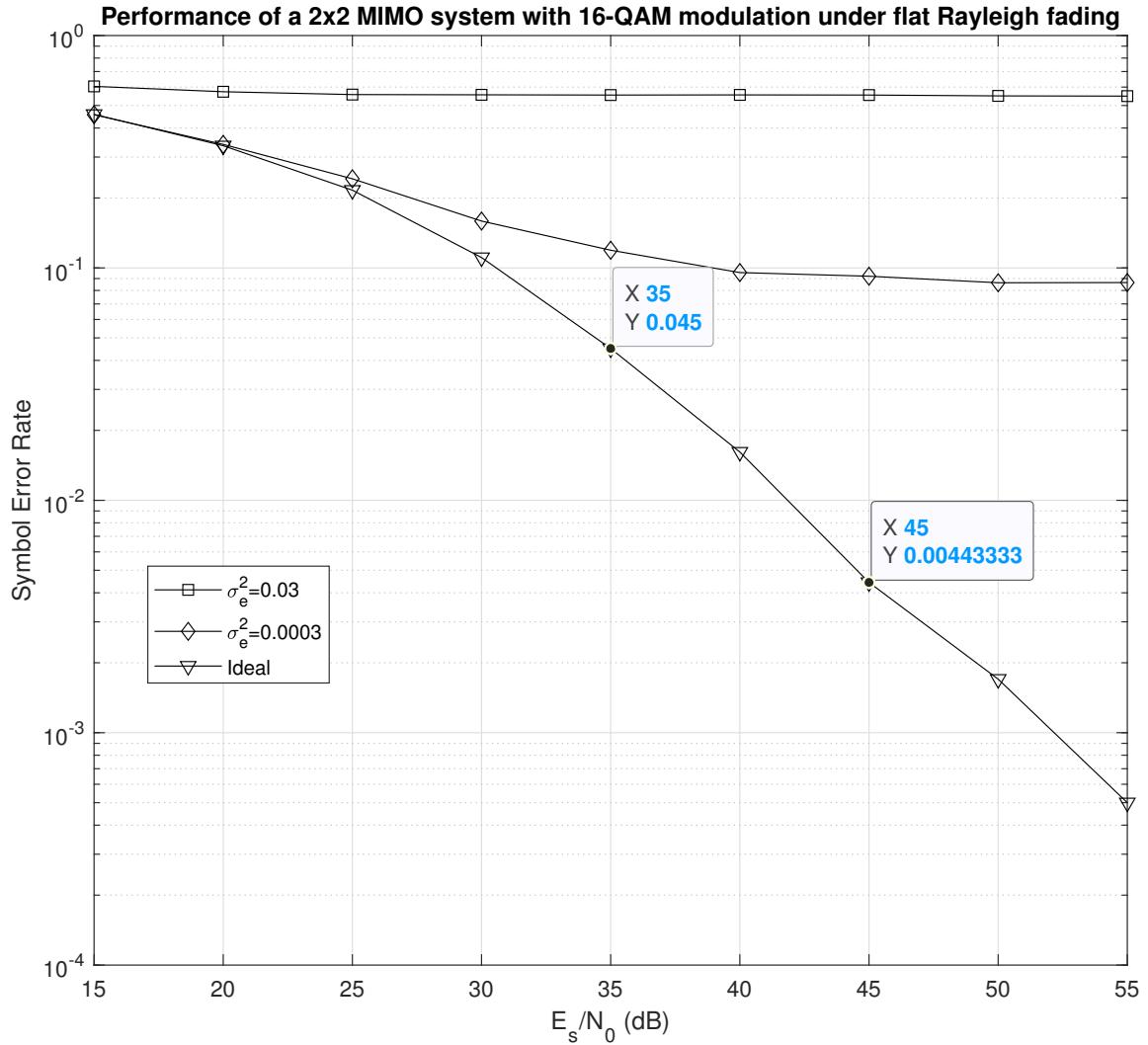
(iii) $\sigma_e = 0.005$: Performance is practically the same is if no errors occur.

Alamouti transmit diversity scheme under flat Rayleigh fading

4. <u>Channel estimation errors in a 2×2 MIMO system with 16-QAM modulation</u>

   (a) MATLAB simulation results:

   Performance of a 2x2 MIMO system with 16-QAM modulation under flat Rayleigh fading

   (b) i. With ideal channel estimation the diversity order is $D = 1$.
       ii. MIMO is very sensitive to channel estimation errors. Error floors are observed.