Performance Evaluation of MIMO Techniques With an SDR-Based Prototype

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Overview

- Why Multiple-Input Multiple-Output
- Performance Evaluation
  - Diversity Techniques
  - Spatial Multiplexing

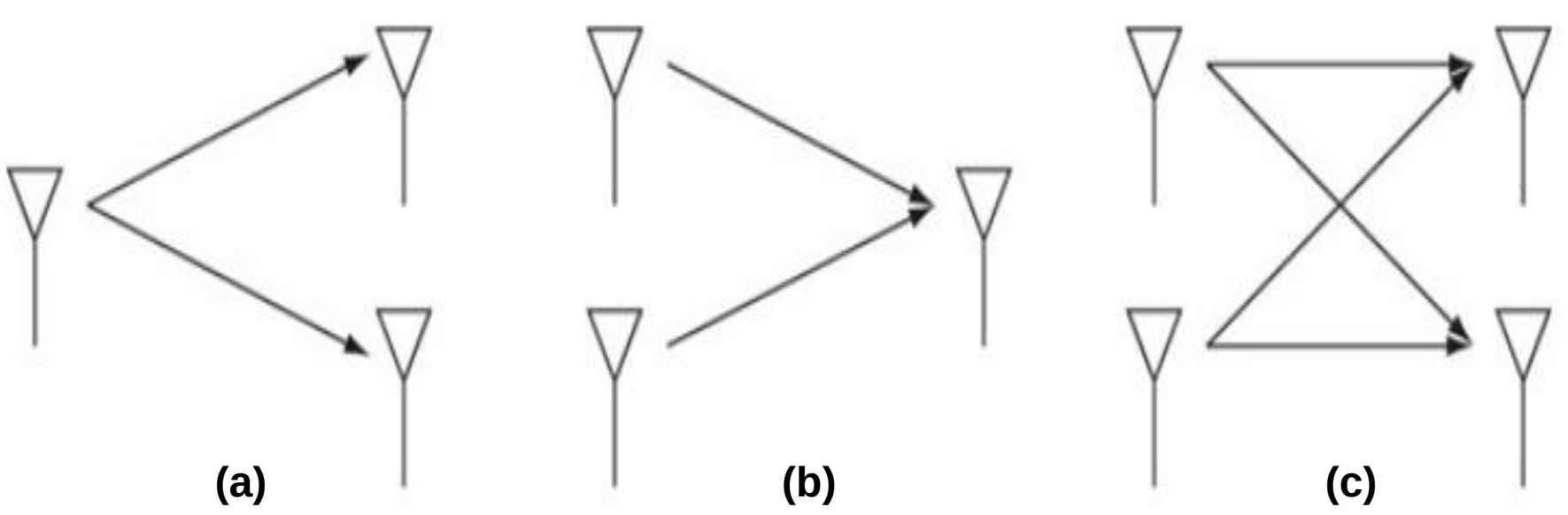
Motivation

- Congestion Across Frequency Bands
- Signal Performance Degraded
- 5G technology

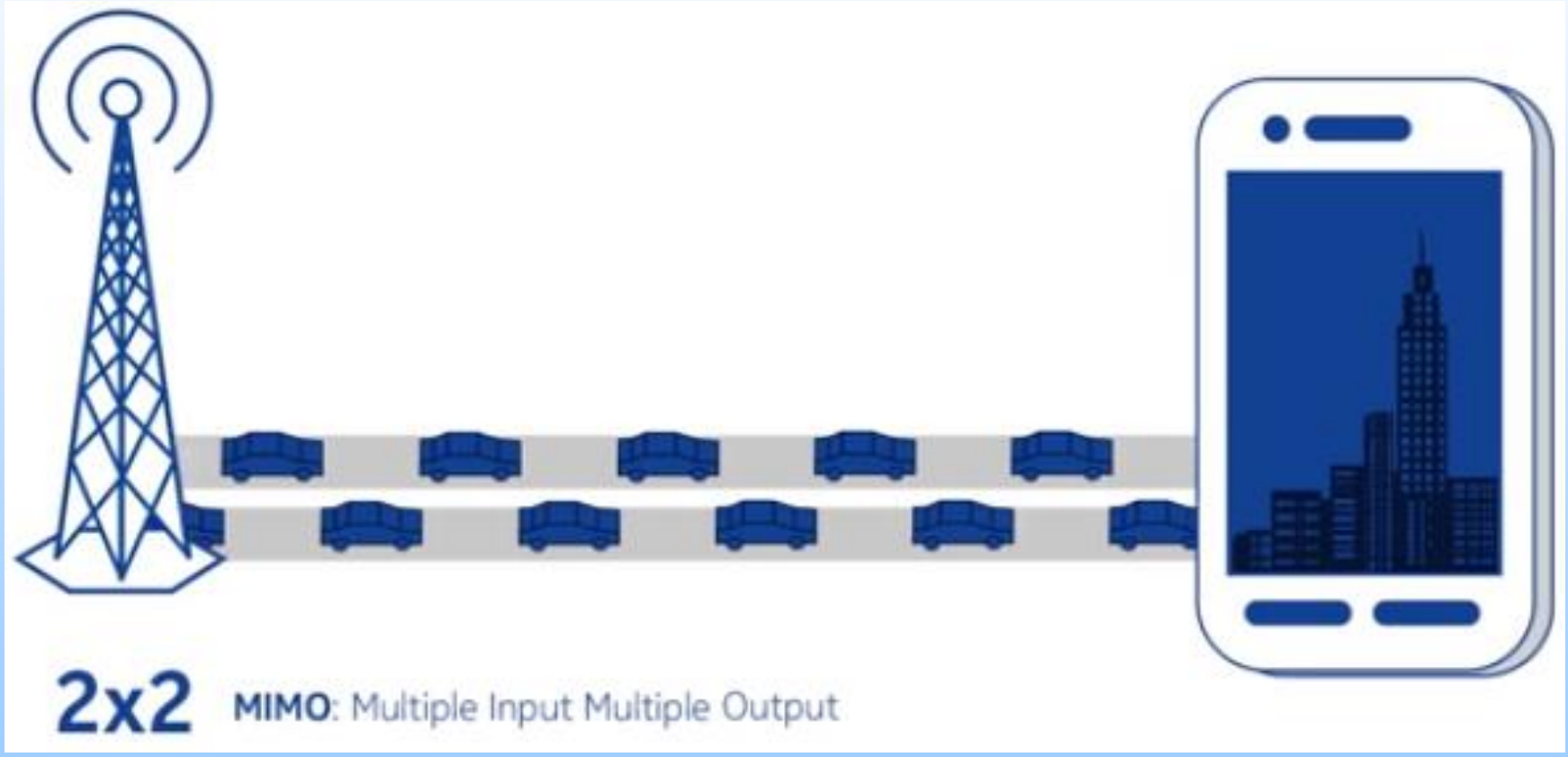
MIMO in GNU Radio Performance Evaluation

Implementation & Results

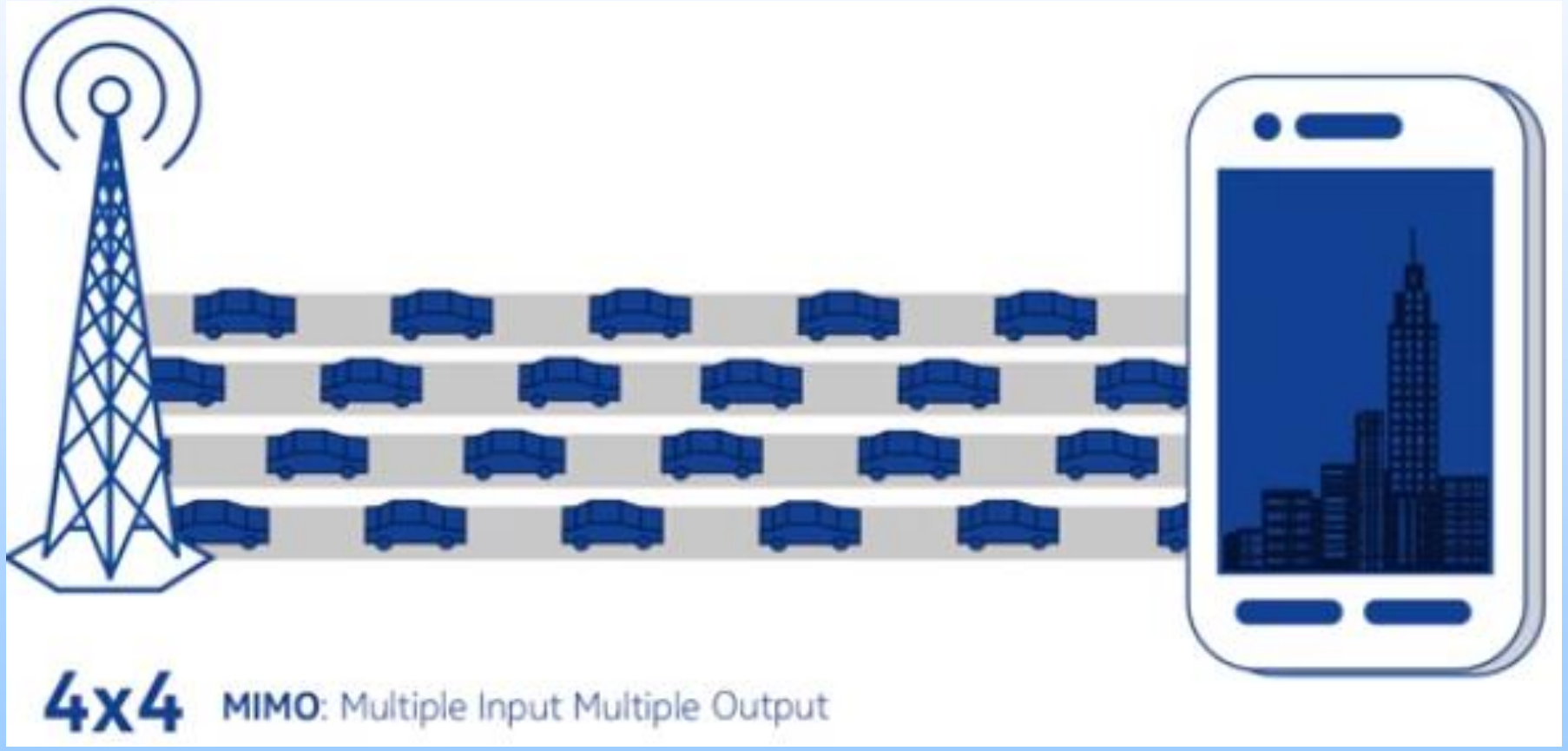
Antenna Diversity



Multiple-Input Multiple-Output (MIMO)

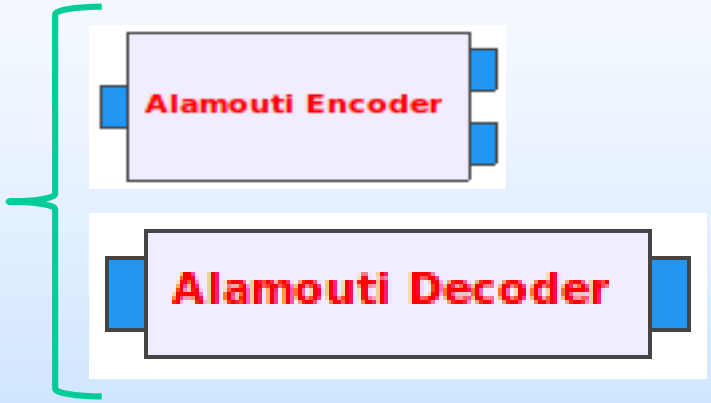


Multiple-Input Multiple-Output (MIMO)



Diversity Techniques

Alamouti Code

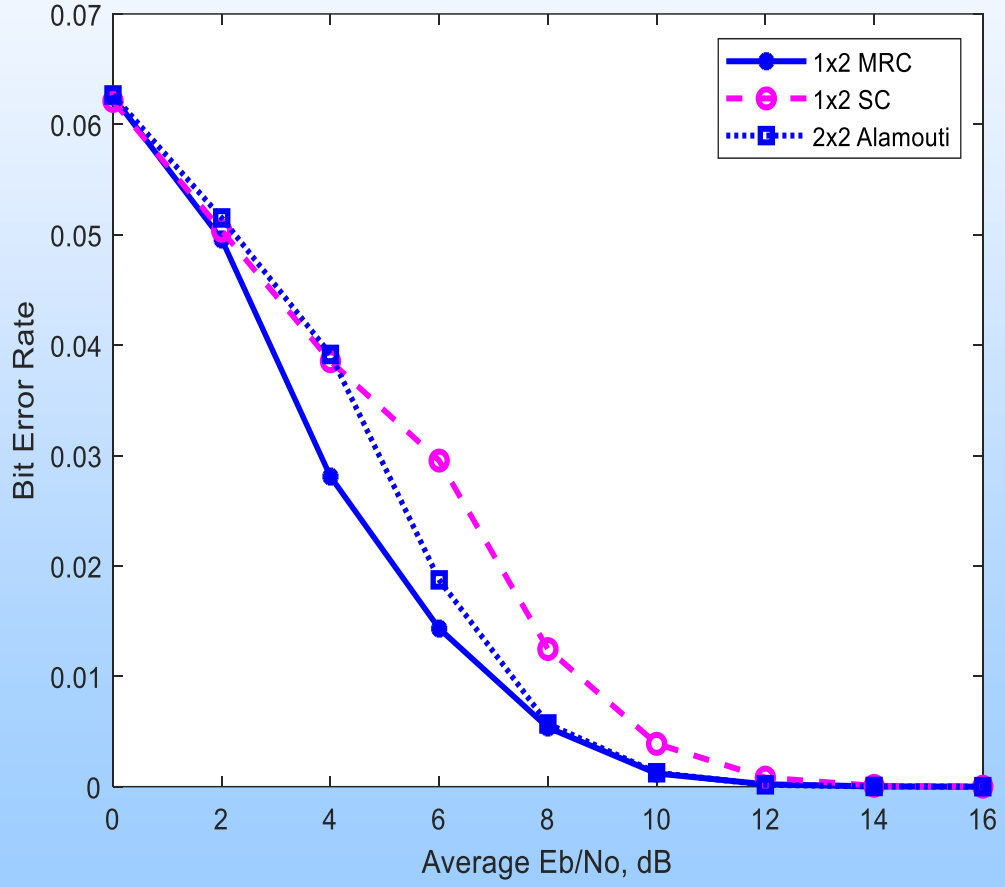


Selection Combining

Maximum Ratio Combining

Diversity Techniques

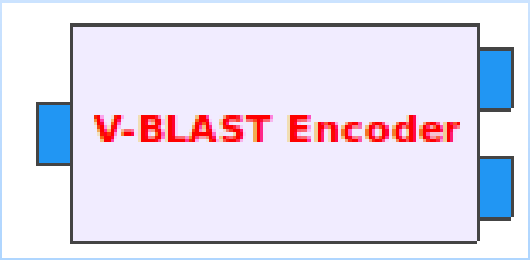
- Alamouti Code
- Selection Combining
- Maximum Ratio Combining

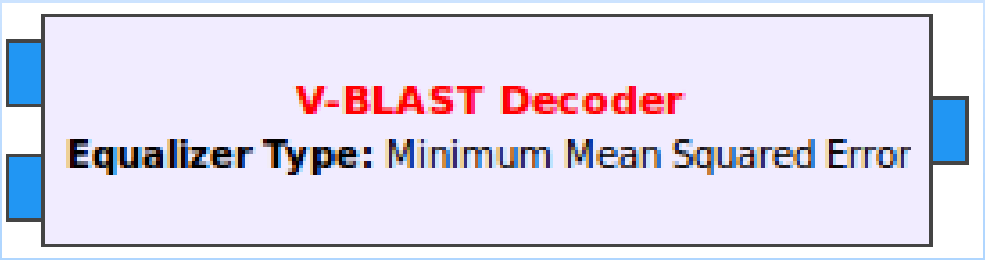


Spatial Multiplexing

Zero-Forcing - ZF

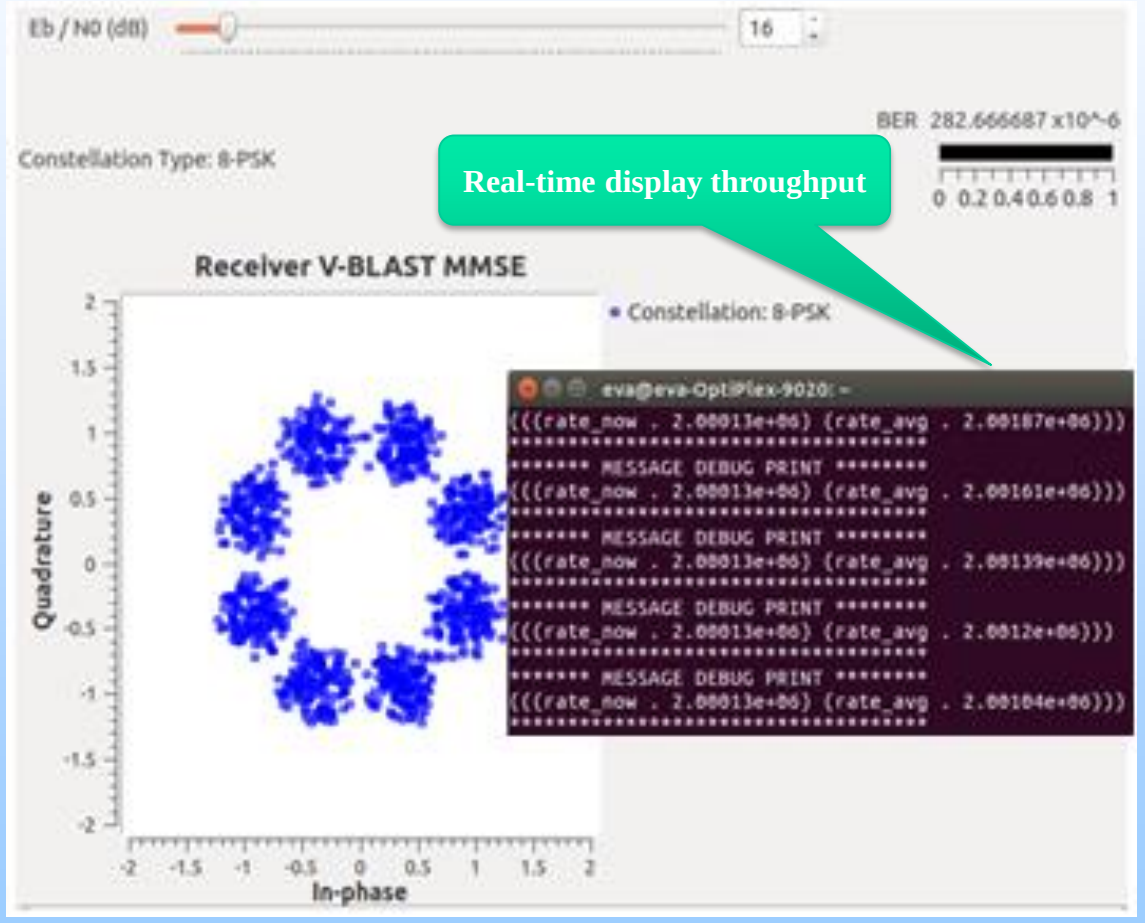
Minimum Mean Squared Error - MMSE





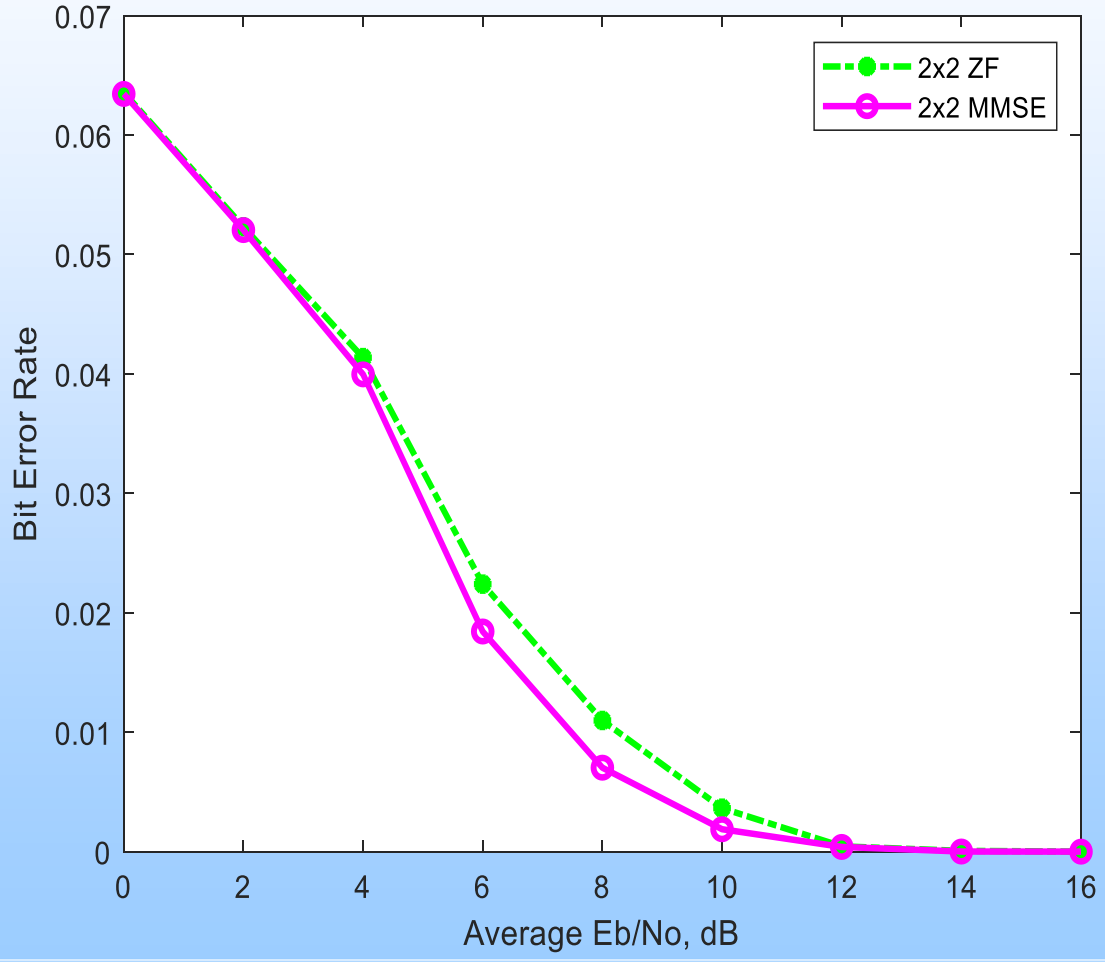
Spatial Multiplexing

- Minimum Mean Squared Error



Spatial Multiplexing

- Zero-Forcing
- Minimum Mean Squared Error



Conclusion

- ✓ The growing demand for high data rates increases the need to utilize spectrum more efficiently
- ✓ Multiple antenna configurations can be used to overcome the detrimental effects of signal multipath and fading
- ✓ Implementation of multiple channels using GNU Radio environment is widely used to support wireless communications research

Questions

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