

## 5.1 Conclusion

Cooperative communications is a new way of communication that draws the idea of using the broadcast nature of the wireless channel to make communicating nodes help each other. Signal fading in wireless communication system due to multipath propagation is a major limitation in the performance of wireless communication systems. Cooperative diversity is a solution to increase the performance of the system and overcome signal fading.

In this thesis Matlab program was used to simulate the performance of the cooperative protocols; Amplify and Forward (AF), Decode and forward (DF) and Quantize and Forward (QF) using a single relay and multi relay in Rayleigh fading channel. The simulation used M-ary Phase Shift Keying (M-PSK) such as; Binary Phase Shift Keying (BPSK), Quadrature Phase Shift Keying (QPSK) and 8 Phase Shift Keying (8PSK). At the receiver side signals were combined using the Maximal Ratio Combining Method (MRC).

The results showed that the relayed signal for QF is comparatively better than AF and DF, yet DF is comparatively better than AF. It was noticed that using a higher-order modulation exhibit higher error-rates; in exchange however they deliver a higher raw data-rate. The results also showed that the two relay has a better performance than single relay.

## **5.2 Recommendations**

A lot of work has been done in this thesis but still there is room for improvement.

- In this work the relay was located in the center between the source and the destination. Some work can be done on changing its location and comparing the performance of the system.
- In this work, MRC was used as a combining method. Other combining methods can be used such as Selection Combining (SC) and Equal Gain Combining (EGC).
- The performance of the wireless channel was measured by SER. Other performance metrics could be used such as the Bit Error Rate (BER) and Outage Probability (OP).