

## **Adaptive Modulation with Moments based Signal-to-Noise Ratio Estimator**

### **Abstract**

Adaptive modulation techniques in wireless communications are reactive ways designed in communication systems to thrive in unpredictable channel environments. The attractive use of adaptive communications will prove to bring more robustness and flexibility compared to fixed modulation schemes. In order for adaptive modulation to work correctly, it requires an accurate estimation of the channel condition at the receivers' end to make decisions and take action. Channel state information (CSI) has several of other uses in wireless communication systems. Accordingly, a communication link which adapts the degree of modulation scheme according to the estimated signal-to-noise ratio(SNR) values is proposed. The system estimates the current channel condition in the form of CSI and feedback to the transmitter. Hence, the objective of the adaptive system is to stay opportunistic in favourable circumstances while achieving acceptable quality margin in a time-varying communication link. In this paper, the overall system is measured using metrics of spectral efficiency and average bit error rate. Monte Carlo simulations of different signals and channel conditions corroborate our analysis and discussion