INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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SHORT ABSTRACT

The objective of automatic modulation classification (AMC) is to classify the modulation type of an unknown communication signal. AMC is a widely investigated area. The initial works on AMC were primarily devoted to single input single output (SISO) systems. There are two main approaches to AMC, namely the likelihood based (LB) and feature based (FB) approaches. The former treats AMC as a multiple hypotheses testing problem, where it considers L *composite hypotheses* H^0, H^1,...,H^{L-1} *corresponding to* L *modulation types. The multiple hypotheses testing procedure maximizes the likelihood function of the received signal with respect to the hypotheses to decide the modulation type of the received signal. The LB approach can provide optimal performance in the Bayesian sense, but it suffers from high computational complexity. The FB methods, on the other hand, are not optimal in the Bayesian sense, but they require less a priori information and a low computational power. Two widely used AMC features are the higher order moments (HOMs) and higher order cumulants (HOCs). With the rapid development of the multiple input multiple output (MIMO) technology and its remarkable capacity gain over the traditional SISO technology, there are serious efforts to integrate this technology into the current generation wireless systems. Designing AMC algorithms for MIMO systems is a challenging task because the mutual interference generated by MIMO spatial channels alters the statistical properties of the modulated signal. The objective of this research work is to classify the modulation type for MIMO systems. Many studies have addressed this challenging problem. However, there remain several research issues. This thesis addresses some of these issues.*