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QAM Classification using Higher-Order Cyclic Cumulants

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Abstract

Automatic identification of the modulation type of a signal is a rapidly evolving area. It is simply an intermediate step between the processes of signal detection and demodulation. However, QAM classification becomes challenging when increasing the number of points in the signal constellation. Therefore, an attempt is made to investigate performance of quadrature amplitude modulation (QAM) signals with higher order cyclic cumulants (CCs) under probability of correct classification (P_{cc}) measurement within a pattern recognition framework. The theoretical and simulation results are shown by choosing the feature vector, a combination of fourth and sixth order CCs. A comparison is also made with P_{cc} values by choosing fourth order CC alone. The proposed feature shows much higher performance especially at low signal-to-noise ratio. More importantly, the combination feature vector selected is robust to phase noise influence and carrier frequency offset.

Keywords: *Carrier frequency offset, Cyclic cumulant, Phase noise, QAM*

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