

A New Method for Hard Decision Integration in Detection Systems

Ahmed M. ElBakly

Arab Academy for science, Technology & Maritime transport in Cairo, EGYPT

Abstract- Most of the generalized selection combining (GSC) schemes are developed assuming the noise is additive white Gaussian (AWGN). AWGN model realistically represents the thermal noise at the receiver, but ignores the impulsive nature of atmospheric noise, electromagnetic interference, or man-made noise which might be dominant in many practical applications. Moreover most of the GSC schemes are developed for slow flat fading channel. However, in practice, most wireless channels of the communication systems, such as mobile radio, are time varying frequency selective fading channels. In this paper, an adaptive GSC receiver that uses multiple antennas to provide diversity against fading is developed for time varying frequency selective fading channel contaminated with class-A impulsive noise. The receiver adaptively selects and combines a subset of diversity branches out of the available branches and discards the others. This is performed by comparing the maximum likelihood (ML) metric of each diversity branch with a threshold. The branches that exceed the threshold are selected and combined. The proposed GSC receiver dynamically adjusts the threshold value according to the time variations of the channel. Since the noise is impulsive, channel estimation is performed by sign algorithm which is more stable than LMS algorithm in presence of strong impulsiveness of the noise.

Keywords- AWGN, adaptive GSC receive, multiple antennas