Theoretical BER Analyzing of MPSK Signals Based on the Signal Space

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Abstract : Based on the optimum detection, signal projection and Maximum A Posteriori (MAP) rule, Proakis has deduced the theoretical BER equation of Gray coded MPSK signals. Proakis analyzed the BER theoretical equations mainly based on the projection of signals, which is difficult to be understood. This article solve the same problem based on the signal space, which explains the vectors relations among the sending signals, received signals and noises. The more explicit and easy-deduced process is illustrated in this article based on the signal space, which can illustrated the relations among the signals and noises clearly. This kind of deduction has a univocal geometry meaning. It can explain the correlation between the production and calculation of BER in vector level.