Performance Analysis Of Coherent TCM Systems With Diversityreception In Slow Rayleigh Fading

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Summary

Coherent trellis-coded modulation (TCM) systems employing diversity combining are analyzed. Three different kinds of combining are considered: maximal ratio, equal gain, and selection combining (SC). First, the cutoff rate parameter is derived for equal gain combining (EGG) and SC assuming transmission over a fully interleaved channel with flat slow Rayleigh fading, which permits comparison with previously derived results for maximal ratio combining (MRC). Then, tight upper bounds on the pairwise error probabilities are derived for all three combining techniques. These upper bounds are expressed in product form to permit bounding of the bit error rate (BER) via the transfer function approach. In each case, it is assumed that the diversity branches are independent and that the channel state information (CSI) can be recovered perfectly. Also included is an analysis of MRC when the diversity branches are correlated-the cutoff rate and a tight upper bound on the pairwise error probability are derived. It is shown that with double diversity a branch correlation coefficient as high as 0.5 results in only slight performance degradation

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