

OPTIMUM RECEPTION IN NONGAUSSIAN ELECTROMAGNETIC  
INTERFERENCE ENVIRONMENTS: II. OPTIMUM AND SUBOPTIMUM  
THRESHOLD SIGNAL DETECTION IN CLASS A AND B NOISE\*

by

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ABSTRACT

In this second part of an ongoing study, the general problem of optimum and suboptimum detection of threshold (i.e. weak) signals in highly non-gaussian interference environments is further developed from earlier work ([1a],[1b];[34]). Both signal processing algorithms and performance measures are obtained canonically, and specifically when the electromagnetic interference environment (EMI) is either Class A or Class B noise. Two types of results are derived: (1), canonical analytic threshold algorithms and performance measures, chiefly error probabilities and probabilities of detection; and (2), various typical numerical results which illustrate the quantitative character of performance. Suboptimum systems are also treated, among them simple cross- and auto-correlators (which are optimum in gaussian interference), and clipper-correlators which employ hard limiters (and are consequently optimum in "Laplace noise"). The various modes of reception considered explicitly here include:(i), coherent and incoherent reception; (ii), "composite" or mixed reception (when there is a nonvanishing coherent component in the received signal; (iii), "on-off" and binary signals, as well as varieties of fading and doppler spread.

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