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Continuous Wave Interference Effects on Global Position System Signal Quality

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Abstract : Radio interference is one of the major concerns in using the global positioning system (GPS) for civilian and military applications. Interference signals are produced not only through all electronic systems but also illegal jammers. Among different types of interferences, continuous wave (CW) interference has strong adverse impacts on the quality of the received signal. In this paper, we make more detailed analysis for CW interference effects on GPS signal quality. Based on the C/A code spectrum lines, the influence of CW interference on the acquisition performance of GPS receivers is further analysed. This influence is supported by simulation results using GPS software receiver. As the most important user parameter of GPS receivers, the mathematical expression of bit error probability is also derived in the presence of CW interference, and the expression is consistent with the Monte Carlo simulation results. The research on CW interference provides some theoretical gist and new thoughts on monitoring the radio noise environment and improving the anti-jamming ability of GPS receivers.

Keywords : GPS, CW interference, acquisition performance, bit error probability, Monte Carlo
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