Abstract :

This paper deals with the analysis of the acquisition process performed by a global navigation satellite system (GNSS) receiver with a pilot and data channel or in case of GNSS hybrid receiver. Signal acquisition decides the presence or absence of GNSS signal by comparing signal under test with a fixed threshold and provides a code delay and a Doppler frequency estimation, but in low signal conditions or in a noisy environment; acquisition systems are vulnerable and can give a high false alarm and low detection probability. Firstly, we introduce a cell-averaging-constant false alarm rate (CFAR) then a data-pilot cell-averaging-CFAR detector fusion based to deal with these situations. In this context, we use a new mathematical derivation to develop a closed-form analytic expressions for the probabilities of detection and false alarm. The performances of the proposed detector are evaluated and compared with a non-CFAR case through an analytical and numerical results validated by Mont Carlo simulations