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An analytical approximation algorithm for inverse incomplete gamma function in STBC recognition. (Chinese. English summary) [Zbl 07339217]

Summary: Computing the inverse of lower incomplete gamma function is involved in signal detection and classification algorithm for radar and communication systems. In order to facilitate its implementation on DSP/FPGA and other hardware platforms and enhance the interpretability of the results, a new approximate analytical solution is proposed in this paper, in which the inverse of incomplete gamma function is transformed to the calculation of the normalized constant of limit distribution of the maximum value of central chi-square random variables. By using the tail equivalence theory, the approximate analytical solution of the inverse of lower incomplete gamma function is derived and can be applied to the threshold selection for space-time block code recognition in multiple input multiple output systems. Simulation results show that when the false alarm probability is less than 0.001, the number of antennas is less than 8 and the sample size is greater than 256, the relative error of the proposed algorithm is less than 10% and its computational time is less than 13 microseconds, which can meet the requirements of the practical engineering applications.

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space-time block code recognition; inverse of lower incomplete gamma function; extreme value theory; tail equivalence theory

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