

## An Efficient Acquisition Algorithm for Long Pseudo-Random Sequence

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**Abstract :** In this paper, a novel method termed the Phase Coherence Acquisition (PCA) is proposed for pseudo-random (PN) sequence acquisition. By employing complex phasors, the PCA requires only complex additions in the order of  $N$ , the length of the sequence, whereas the conventional method utilizing fast Fourier transform (FFT) requires complex multiplications and additions both in the order of  $N \log_2 N$ . In order to combat noise, the input and local sequences are partitioned and mapped into complex phasors in PCA. The phase differences between pairs of input and local phasors are utilized for acquisition, and thus complex multiplications are avoided. For more noise-robustness capability, the multi-layer PCA is developed to extract the code phase step by step. The significant reduction of computational loads makes the PCA an attractive method, especially when the sequence length is extremely large which becomes intractable for the FFT-based acquisition.

**Keywords :** FFT, PCA, PN sequence, convolution theory

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