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Formation and properties of signals based on recurrent codes

Abstract. The algorithm of forming, block diagram of forming device and results of research of correlation properties of poly-phase signals based on recurrent sequences is offered.

Keywords: correlation, polyphase signals, phasecoded signals, signals generation

Introduction

Effectiveness of the objects and scenes monitoring systems is greatly defined by the accuracy of the angle and distance coordinates measurements. Such measurements can be realized in all weather conditions, at day or night only by using the radar systems. The characteristics mentioned above, hindrance immunity and reliability of the radar systems greatly depends on the type of the probe signal.

Well known and already applied signals can't meet the growing demands to monitoring systems. So the search for new algorithms of forming of the new classes of the complex signals is conducted. One of those signals' classes are the signals based on the recurrent codes.

Generation of recurrent codes

Recurrent codes are formed using linear shift registers (D-type flip-flops), modulus summation devices and feedbacks, so on the output of such device the code number will appear every cycle. The structure of the formation device depends on the chosen phase levels of the signal, forming sequence. The code that will be is cyclic and repeats every 2^N-1 cycles (where N – number of phase levels).

The structural scheme of biphase recurrent code generator is shown on figure1.
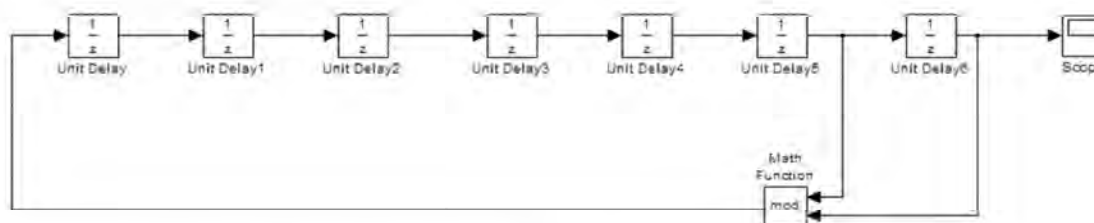

Fig. 1. Structural scheme of bi-phase recurrent code generator

In radar applications it is very important to know the spectral and correlation characteristics of the probe signal. The specter and auto-correlation function are shown on figure 2.
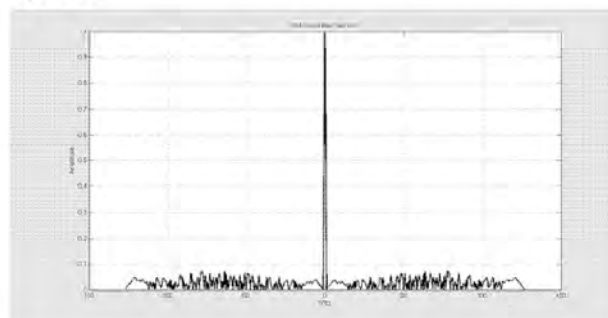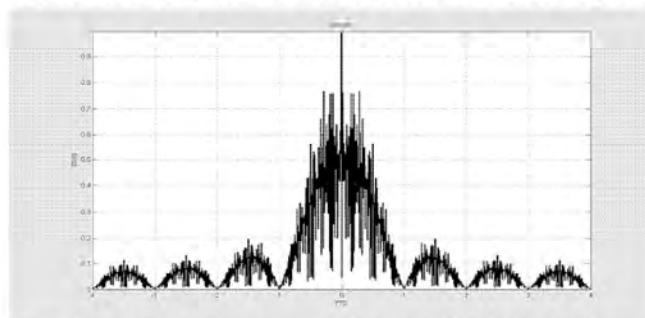

Fig. 2. Specter and auto-correlation function of bi-phase signal

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