Тепер, скориставшись попередньо запропронованою математичною моделлю, здійснили реконстркцію методом власної грані. Використаємо 10 кроків зі значеннями від 0 до 1000. Для демонстрації скомпонуємо разом кроки 2, 40, 400 і 1000 на рис.4.

Висновок. Підсумовуючи поєднання математичних моделей і технології розпізнавання обличчя обіцяє значно посилити системи безпеки автентифікації користувачів. Одним із найбільших зауважень до методу власних граней є суворе вирівнювання вхідних облич, яке вимагається під час навчання та ідентифікації. Подальше дослідження будуть спрямовані на вдосконалення існуючої математичної моделі з метою знаходження найбільш ефективних рішень для розпізнавання облич і, як наслідок, для покращення безпекових властивостей.

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Study of the characteristics of the developed barker-like codes

Abstract – The synthesis of non-periodic signals with correlation properties, which have a linear structure of the spectrum and provide unequivocal measurement and high resolution, is relevant. Signals that satisfy this condition are called signals with the "no more R matches" property. The main requirement for signals with a selected compression ratio is the minimization of autocorrelation side lobes.

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Among the most well-known and more frequently used signals in practice can be noted: Barker codes, M-sequences (Huffman codes), multiphase Frank codes, linear– and V-figuratively frequency modulated signals.

Keywords – autocorrelation function, Barker code, barker-like code, Galois field, numerical lines-bundle.

The method of constructing Z-positional signals with a single-level periodic autocorrelation function is based on the use of properties of similarity and dependence of the field of elements $GF(p^{\alpha})$, $z = \frac{p^{\alpha}-1}{p-1}$. At the same time, it is necessary to have initial irreducible $GF(p)$ polynomials over the field $f(x)$ to construct extended Galois fields $GF(p^{\alpha})$. Then it is necessary to construct complete families of non-inverse -isomorphic difference sets, to find the best among them according to the minimum code length criterion, since all other conditions being equal, it is possible to obtain the maximum filling factor and, therefore, to increase the energy of the sounding signal. On the basis of the received code, we receive pulse signals with the "no more than R-coincidences" property.

To simplify and improve the results of solving the problem, it is important to develop a new approach to the synthesis of codes with good autocorrelation properties that approach Barker codes. One of these approaches is based on the use of the apparatus of the theory of numerical lines-bundles [4, 5].

The method of construction based on numerical lines-bundle (NLB) according to the criterion of the minimum value of the autocorrelation function of a discrete signal is as follows: using the algorithm of selective movements (at $2 < N < 16$), the algorithm of asymmetric branching (at $12 < N < 24$) or the algorithm of constructing a NLB based on ideal ring bundle (at $24 \le N$), choose a variant of the NLB of a given order of N the required length L_N of multiplicity R;

to build L_N - positional code μ_i with $i = 1,2,...,L_N$ a one-level periodic autocorrelation function based on the selected variant of the NLB $(k_1, k_2, ..., k_l, ..., k_N)$,

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where at N the positions of the code with ordinal numbers x_l, $l=1,2,...,N$ which are determined from the formula

$$x_l \equiv 1+\sum_{i=1}^{l} k_i \pmod{L_N}, \tag{1}$$

place symbols "1", and in the remaining $L_N - N$ positions -symbols "-1".

The resulting sequence is an impulse sequence with the property "no more R -matches" and the minimum value of the autocorrelation function. By choosing another variant of the NLB with such parameters (if it exists), we can obtain other pulse sequences with the property "no more R -matches" and the minimum value of the autocorrelation function.

Let's consider an example of building according to the given method of pulse sequences based on IRB, $L_N = 28$, $N=12$, $R=5$:

from the two existing variants of simple IRBs of the order $N=12$, built according to the algorithm of selective movements, we choose, for example, the first variant of IRBs:

(1, 1, 3, 1, 1, 7, 2, 2, 3, 3, 3, 1);

we build a sequence in which the length of the code is $L_N = 28$; in twelve positions $(N=12)$ we place symbols "1" according to formula (2), and fill the rest of the positions with symbols "-1":

1, 1, 1, -1, -1, 1, 1, 1, -1, -1, -1, -1, -1, -1, 1, -1, 1, -1, 1, -1, -1, 1, -1, -1, 1, -1, -1, 1.

The resulting sequence is an impulse sequence with the property "no more R -matches", for which the value of the autocorrelation function does not exceed two (with the exception of the main petal):

28, -1, 0, 1, -2, 1, 2, 1, -2, 1, -2, 1, -2, 1, 2, -1, 2, -1, -2, -1, - 2, -1, 2, -1, -2, -1, 0, 1.

Here, the ratio of the main petal to the other petals is 14, which is more than Barker signals. By choosing other variants of IRB, we can similarly obtain variants of discrete signals with the specified properties.

Conclusion. Therefore, the use of ideal ring bundles for the synthesis of discrete signals makes it possible to simplify their construction, due to the exclusion

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of such operations as finding primitive irreducible polynomials $GF(p^{\alpha})$ over the field minimum length.

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Methods for information coding in mobile systems

Abstract – Naturally, there is a need to protect information from unauthorized access, theft, destruction, distortion and other criminal acts. The concept of information vulnerability is introduced, which describes the effectiveness of selected methods for information protection. With the development and complication of methods and forms of automation of information processing processes, its vulnerability increases. The spectrum of problems expands significantly when the user starts working with wireless networks, because errors may occur during data transmission over these communication channels. Their reasons may be different, but

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