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New Binary Code Combined with New Chaotic Map and Gold Code to Ameliorate the Quality of the Transmission

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Abstract

While the private radio communications field has grown in recent years, the communication method known as spread spectrum name has gained much prominence. A spread spectrum method can be combined with multiple access method CDMA for dividing sequences to create multi-user communication systems with very good performance of interference between symbols.The production of the chaotic sequence in scanning system and the information system according to DS-CDMA remains a hot research problem in this study to supervise in the knowledge wireless communication. This fact is still a question in establishing the secret code random spread sequence between the transmitter and the receiver.In DS-SS's spreading is important to embed security information.It can avoid many problems in the complex calculation of the true circle. Furthermore the pseudo chaotic is reconstructed in the conventional gold to change shape with the logical operator "XOR" the results in simulation result shows in progress.It improves also the computing speed as this can solve the new equation of the problem in the original logistic map.There certainly has a kind in design: spreading chaotic sequence, chaos with gold code; including the number of users.So these are less in number and also limit the security and to can improve the ameliorate the quality of the transmissionand performance in terms of allowable number of users. The Bit error rate (BER) performance of the system is evaluated in multi-user environment under AWGN and reveals that the DS-SS system using new binary code combined with new logistic mapand gold code to ameliorate the quality of the transmission.

Keywords: *DS –SS, DS -CDMA, new binary code, Gold code, new logistics Map*

1. Introduction

Actualty the spread spectrum plays an increasingly important role because of its inherent advantages such as immunity to noise and due to its practical applications for transceivers short-range data and which in the end they understand satellite navigation systems GPS, mobile telecommunications 3G, W-LAN (IEEE 802.11) [1], The spread spectrum technology also helps the endless race between the needs of mobile communication and CDMA radio frequency availability situations where spectrum is limited and, therefore, an expensive resource. Each technique uses the *direct spread spectrum sequence* (DS-SS) to allow simultaneous transmission of signals from multiple users within the same frequency band, while maintaining relatively low rate user interference to user. Another very important objective in designinga communication system is security. This is very essential in military communication. In fact, the need for high security in military communication led to the development of a modulation system known as Spread Spectrum Modulation during Second World War [2]. Even for a single user transmission, the signal propagation is often hidden in the lower portion of the sound level, which results in the transmission mask. Furthermore, the choice of the spreading sequences (generally pseudorandom) signal that itself has statistical characteristics that resemble noise and is therefore difficult to detect.

The production of the spreading sequence in scanning system and the information system according to DS-SS remains a hot research problem in this study to supervise in the knowledge wireless communication. This fact is still a question in establishing the secret code random spread sequence between the transmitter and the receiver. In DS-SS's spreading is

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important to embed security information. It can avoid many problems in the complex calculation of the true circle. Therefore we intend through this study to find out how to ameliorate, secur and synchronize the communication system.

Initially in order to sprea spectrum of the transmitting signals, The Gold code generators are used extensively in communications systems to generate code sequences with good correlation properties, which is useful when multiple devices are broadcasting in the equal frequency range and larger code sequences domains than m-sequences [3]. Conventional Gold code sequences are typified by xoring for tow classes of maximal length m-sequences depends on the number of shift registers. The number of sequences generated by linear feedback shift register (LFSR) may be insufficient for wideband DS-SS with a very large number of users [4].In addition, LFSR techniques provide limited flexibility in incorporating security into multiple user systems [5]. Studies in non-linear dynamical systems have developed chaotic theories. The application of chaotic sequences to a direct sequence spread spectrum (DS-SS) system was first as studied in [6].

The use of the chaotic sequence as the spreading sequences has been proposed as it must seem absolutely random. This Chaotic Pseudo-Random Number Generators (PRNG) has been discussed in [7]. Therefore, we need a digital chaotic generator with important cryptographic properties such as balance on {0, 1}; long-cycle length; high linear complexity; like auto-correlation; cross-correlation near to zero [8]. Therefore the important characteristics of the chaotic systems include the presence of the notion of unpredictability and the impossibility of predicting the state of the system in the long term. Indeed, the final state depends essentially on the initial state and a small shift of the initial state leads to completely different results. In addition, the chaotic sequences have good random property, low generation complexity and better data security. With these properties, chaos sequence can be used as a random number generator. One of the simple systems are used to generate chaotic sequence is in the logistic map.

In this paper, we discussed the proposed design of a new DS-SS communication scheme. Here, a new the spreading sequences through the use of pseudo chaotic is reconstructed in the conventional gold to change shape with the logical operator (XOR) the results in simulation result showm in progress. It improves also the computing speed as this can solve the new equation of the problem in the original logistic map, such as limited parameter range, complex computing and complication of the real circle. This a new chaos system proposed in [9], which has larger key space and iterant range and the result prove that the new chaos system has better performance than that of the Logistic Map and it can improve the security of the encryption system. There certainly has a kind in design: spreading chaotic sequence, chaos with gold code; including the number of users. This feature allows chaotic systems to provide an infinite number of sequences of equally different sequences. In addition, the chaotic sequences have good random property, low generation complexity and better data security. So these are less in number and also limit the security and to can improve the amelioration the quality of the transmission and performance in terms of allowable number of users. The analysis was carried out to see the Bit error rate (BER) performance of the system is evaluated in multi-user environment under AWGN and reveals that the DS-SS system using new binary code combined with new logistic map and gold code to ameliorate the quality of the transmission. Therefore, the proposed sequences can be effectively used as spreading sequences in high data rate communication.

2. The Spread Spectrum Direct Sequence

Direct sequence spread spectrum is one of the spread spectrum techniques. Traditionally, a *pseudo random sequence* (PN) is used for *direct-sequence code division multiple access* (DS-CDMA) systems, but it lacks security due to fact that there are limited number of available PN sequence of and they show periodic correlation properties. CDMA (Code Division Multiple Access) or DS-CDMA is a spread spectrum technology, allowing many users to occupy the same time and frequency allocations in a given band/space. The CDMA assigns unique codes to each communication to differentiate it from others in the same spectrum.

2.1. Principle DS-SS

A DS-SS system is one of the main spread spectrum systems and is the most common version use today, due to simplicity and easy implementation, in which a modulation of a carrier is performed by a code sequence. In the actual practice the baseband information is digitized and Modulo-2 added to the code sequence and then modulated usually by phase-shift keying (PSK) at the code rate. One modulation scheme used in this study was Binary Phase Shift Keying. The advantages of the method are: As the signal is spread over a large frequency-band, the Power Spectral Density is getting very small. However the Gaussian Noise level is increasing, random Access can be dealt with; as a large number of codes can be generated a large number of users can be permitted and good Security without knowing the spreading code, it is nearly impossible to recover the transmitted data. The block diagram shown in Figure 1 illustrates a communication system [5]. The upper row of blocks represents: Transmitting Information the binary data d_t with symbol rate, Rs =1/Ts (which is equal to bit rate R_b for BPSK). The spread spectrum direct sequence is multiplied by the information to be transmitted by a flow R_b the pseudorandom code or pseudo-noise code (PN_t with chip rate, $R_c = 1/T_c$), also called signature, having a flow rate R_c [10], [11]. We have:

$$N = \frac{T_C}{R_b} = \frac{T_b}{T_c} \tag{1}$$

Where $T_b=1/R_b$: The duration of an informationor symbol period and $T_c=1/R_c$ is the duration of a rectangular pulse code called chip or chip period. The N is typically an integer greater than 1, since the spread spectrum measurement and is the number of chips rat information bit. Figure1 shows a general diagram of a system spread spectrum direct sequence [10], [11].

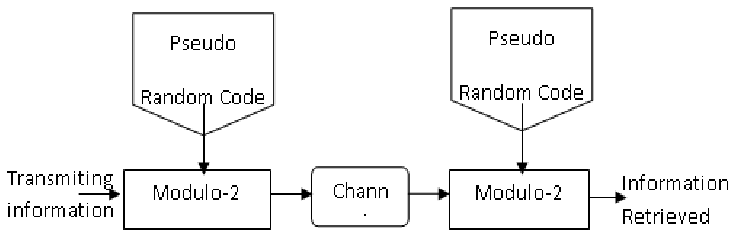

Figure 1. Subclass a spreading system Spectrum

A generation of Pseudo-Random code is the core for spread spectrum systems. The classical M-sequences and Gold sequences are not suitable, since their number and security is not friendly to DS-SS systems.These sequences are generated by shift registers and periodic in nature. So these sequences are less in number and also limit the security. We use a technique called "Chipping" To: Compensate for the loss of information. Minimize background noise and Local interference. During data transmission, each bit is "added" using an exclusive-or (XOR) with a series of 11 bits called Barker code {10110111000} which has some mathematical properties making it ideal for modulating radio waves. The PN code as described by the chipping Figure 2. The random sequences can be determined as we we have sufficient knowledge of the algorithm being used for the generation and the initial state of the random number generator [12].

The result is a digital stream at high speed, all which is modulated onto a carrier with Binary Phase Shift Keying (BPSK) which each phase change encodes one bit of the packet to be transmitted by the repeating PN code. At the receiver, the original signal is: Recovered by collecting all the channel and spread the demodulating the same with the code. Spreading and Dispreading DS-SS system are [10], [11] described by Figure 3.

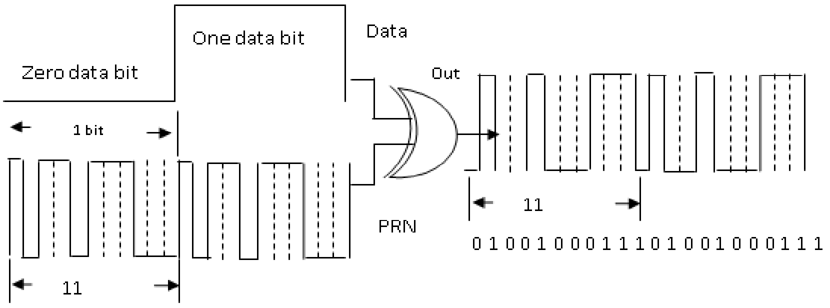

Figure 2. Code PN – chipping

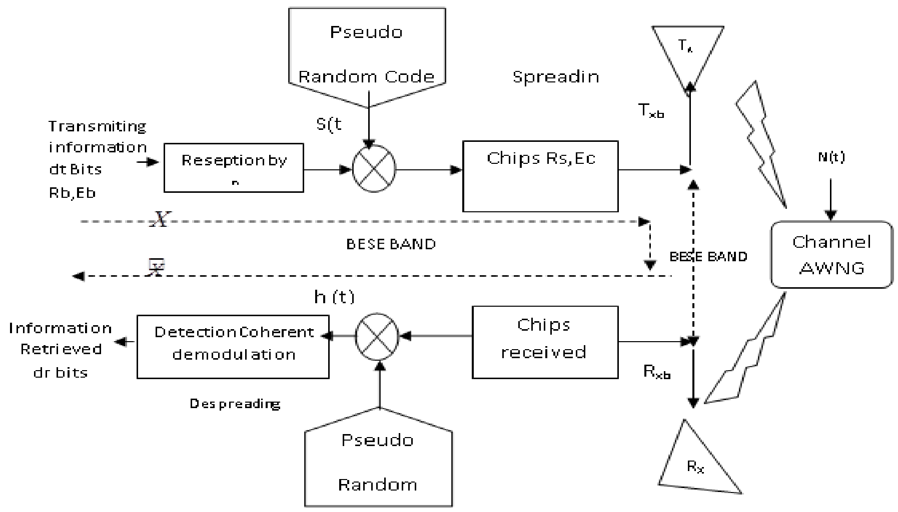

Figure 3. Block diagram of a DS-SS system

At the transmitter, the information data d_t is encoded using codes PN. The encoded informationis then transformed into a data modulated symbol sequence with amplitude of {±1} by using Modulat BPSK, with energy E_b and bit rate R_b.To implement the DS-SS system, every information bit is first repeated n times, and then the repeated information bits are randomized by a spreading code, or a PN code $S_c(t)$ [10], [13]. A short code system is implemented here which uses the same spreading sequence for each bit and the period of the sequence is equal to the *spreading factor* (SF) .After the spreading, it gives the so-called channel bits which are known as chips. The effect of multiplication of S_t with a PN sequence S_c (t) is to spread the base band band width R_b of S_t to a base band bandwidth of R_c. The spread spectrum signal cannot be detected by a conventional narrowband receiver.

$$T_{xb}(t) = S(t).S_c(t) \tag{2}$$

In the receiver, the received base band signal R_{xb} is multiplied with the PN sequence the receiver (S_{cr}). If $S_{cr} = S_{ct}$ and synchronized to the PN sequence in the received data than there covered binary data is produced on d_r. The effect of multiplication of the spread spectrum signal R_{xb} with the PN sequence $S_c(t)$ used in the transmitter is to despread the bandwidth of R_{xb} to R_s. For an AWGN channel, the received spread signal out is:

$$R_{xb}(t) = T_{xb}(t) + N(t) \tag{3}$$

Where S (t) is the transmitted signal, and N(t) is the Gaussian white noise.
Note: In order to generate such a signal, we can use (*randn*) function in Matlab software.

$$N(t) = \text{sqrt}(N0/2) * \text{randn}(1, \text{length chips}) \quad (4)$$

Then when the receiver multiplies this signal by a synchronized reproduction of the chaotic Bit-Sequence map of spreading out, this output:

$$d(t) = R_{xb}(t).S_c(t) \quad (5)$$

Since the PN sequence is used as $S_c(t)$, it gives S_c^2 (t) =1 and the noise term N' (t) = N(t). Sc (t) which has approximately the same statistics as N(t). Thus, the received signal is given by equation (6):

$$d(t) = S(t) + N'(t) \quad (6)$$

With d(t): indicating that spreading and de-spreading have no impact on signals transmitted over AWGN channels with respect to the noise suppression.

3. Design of A New Pseudo-Random Bit Generator

This section, a new algorithm to generate random bits (RBG), using chaotic maps combined with the Gold sequences. Figure 4 shows the structure of the proposed generator. In this figure, each chaotic map produces chaotic real numbers Determined in a range, based on the initial state and selected chaotic maps. Then, the generated real numbers are converted to binary numbers, in order to be used as a random bit sequence. The second generator Gold code based on two *Maximimum Length Sequence* (MLS), and called Maximum coupled length. The secret key of the system k consists of the initial key Gold code and parameters (k, µ) of the new chaotic system. Finally, the output of the system is chaotic sequences and forms combined with the following standard based on Gold sequences running XOR block.

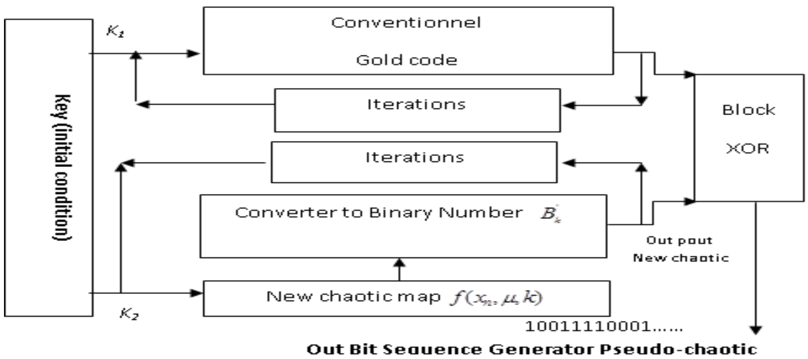

Figure 4. Bit Sequence Generator Pseudo-chaotic

3.1. Gold Sequence

In 1967 and 1968 GOLD offered its own codes that are created by EXOR-ing for two M sequences of equal length [13], [14], [15], as shown in the Figure 5 the two M-sequence must maintain the same phase relationship till all the additions are performance.

A *Linear Feedback Shift Register* (LFSR) is a mechanism for generating a sequence of binary bits. The register consists of a series of cells that are set by an initialization vector that is, most often, the secret key. The MLS has 2^n-1 states, where n is the number of registers in the LFSR. To give the feedback there is a predefined registers or taps in the register. They will give feedback to the left most register through (XNOR) or (XOR) gate. A value of all "1" is illegal in the case of XNOR feedback and a value of all "0" is illegal in the case of XOR feedback because in this state the counter would remain locked-up.Here we are creating pseudo noise using LFSRs to convert narrow band signal into wide band signal [13], [16]. A bit shift register, as described by Figure 6 represents PN sequence generator.

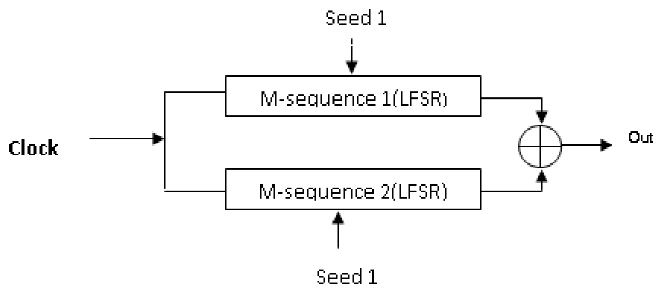

Figure 5. Generation of Gold Code using LFSR

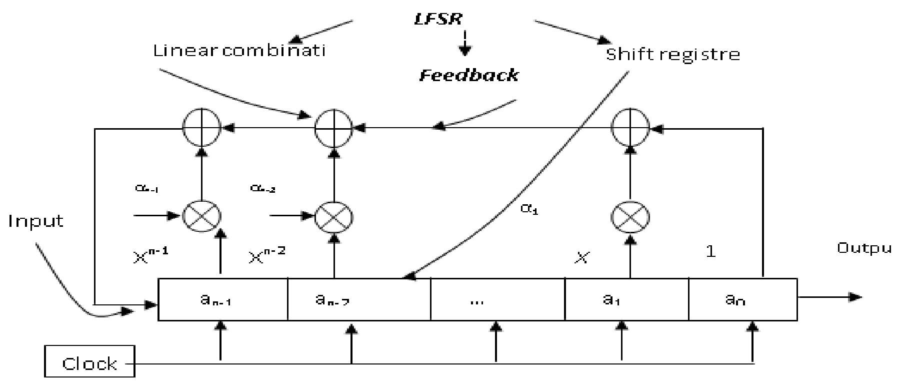

Figure 6. PN sequence generator

In Figure 5, when the initial values are all equal to zero, the register remains in the same state permanently: The maximum number of the possible states different from ‘0’, binary sequence period N=2^n -1, the polynomial of the LFSR is defined by:

$$P = 1 + \sum_{i=1}^{Lc} \alpha_i X^i \text{ And } \alpha_i = \text{‘1’ or ‘0’} \tag{7}$$

The Gold sequences is constructed from two preferred maximum length sequences of length N = 2^n-1 with. Their cross-correlation functions pair takes only three values {-1, - t (n) and t (n) - 2}, or:

$$t(n) = \begin{cases} 2^{(n+1)/2} + 1, n & \text{odd} \\ 2^{(n+2)/2} + 1, n & \text{even} \end{cases} \tag{8}$$

Resultant sequences are called preferred sequences [13]. Preferred sequences are utilized to produce many well known families of binary sequences with good cross-correlation properties as:

$$R_{x,y}(m) \in \begin{cases} \left\{-1, -\left[2^{(n+2)/2} + 1\right], \left[2^{(n+2)/2} - 1\right], n & \text{even} \right. \\ \left\{-1, -\left[2^{(n+1)/2} + 1\right], \left[2^{(n+1)/2} - 1\right], n & \text{odd} \right. \end{cases} \tag{9}$$

With n equals the number of latches of shift registers of the two highest original sequences. Figure 7 which are polynomials, for example the gold code the length 31.

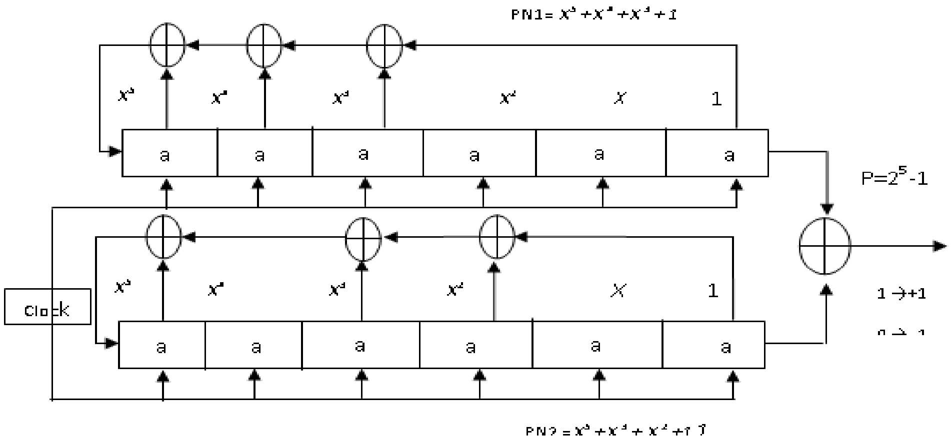

Figure 7. Example Gold code of length 31

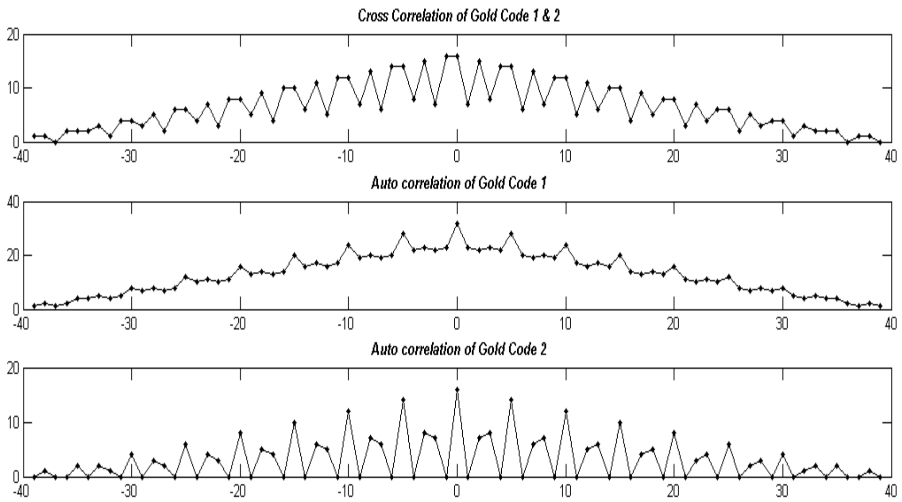

Figure 8. Auto-correlation and Cross-correlation of binary Sequences, Gold codes length = 31

Figure 8 illustrates the auto-correlation and Cross-correlation of binary sequences, Gold codes take here a maximum length PN sequence; we used the PN sequences as well as the gold code of 5 bits. While drawing us take 4 consecutive sets of two gold codes so that the final cross-correlation occurs between two Gold codes, and each of the 40-bit PN sequence length. Simulation the results by MATLAB given here: Code Gold (# 1: 11011, # 1: 01001).

3.2. Chaotic Sequence Generator Bits

Various nonlinear dynamical systems are used to generate chaotic sequence as: tent map, logistic map and the Bernoulli map. In this stady the generation of chaotic sequences new map is studied by analyzing the bifurcation diagram and analyzing the *Lyapunov exponent* (LE) for each of them [17]. The Chaotic sequence is:

$$x_{n+1} = f_{\mu}(x) \text{ and } \quad 0 < x_n < 1, \ \ n = 0,1,2 \tag{10}$$

1. Logistics map is one of the well known in the dynamic non-linear systems theory and defined by the equation (11):

$$x_{n+1} = f_\mu(x_n) = \mu.x_n(1-x_n) \quad \text{and} \quad x_n \in [0,1] \tag{11}$$

Where n ∈ N and μ= 3.999≈4.

2. We propose a new discrete chaotic system which is shown in formula (12), [9] as below :

$$x_{n+1} = \mu.x_n - x_n^2 / k \tag{12}$$

Where μ= 3.999≈4 and the value of the k parameter is set to any value other than zero without limitation (k=1000), and the initial value is given as x_0=0.1.

A bifurcation diagram is a visual summary of the succession of period-doubling produced as μ increases. The Figure 9 and 10 shows the bifurcation parameter μ is shown on the horizontal axis of the plot and the vertical axis shows the possible long-term population values of the logistic function.Thes results from the figures obtained from Matlabs.

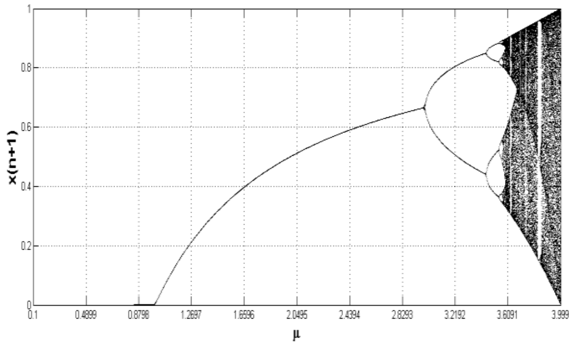

Figure 9. The bifurcation diagram for the Logistic map for 0.1 ≤μ ≤ 3.999

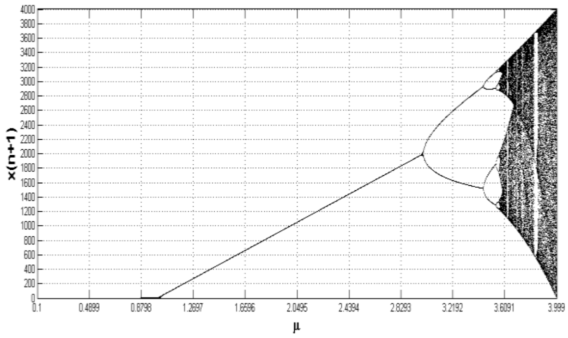

Figure 10. The diagram bifurcation for the new logistic map for 0.1 ≤μ ≤ 3.999

The systems and the deterministic chaotict are also in contrast characterized by an extreme sensitivity to the small changes in their initial conditions. The Russian Alexander Lyapunov (1857-1918) [17], who introduced the quantity called LE. This exhibitor is to quantify how fast the dynamic behavior of a system is likely to differ depending on the initial conditions applied that we occur on it. Let's suppose now that we change this begins conditions of ε_0 so that $f(x_0)$ becomes $f(x_0+\varepsilon_0)$ after (n+1) successive states, the change in the state $f(x_n)$ will be written $f(x_n+\varepsilon_n)$ so that the amplification of the variation among states x_0 and x_n is quantified by the equation (13):

$$\ln\left|\frac{\varepsilon_n}{\varepsilon_0}\right| = \ln\left|\frac{\varepsilon_n}{\varepsilon_{n-1}}\right| \cdot \left|\frac{\varepsilon_{n-1}}{\varepsilon_{n-2}}\right| \ldots \left|\frac{\varepsilon_1}{\varepsilon_0}\right| = \sum_{i=1}^{n}\left|\frac{\varepsilon_i}{\varepsilon_{i-1}}\right| \quad (13)$$

Where:

$$\left|\frac{\varepsilon_i}{\varepsilon_{i-1}}\right| = \left|\frac{f(x_{i-1}+\varepsilon_{i-1})}{\varepsilon_{i-1}}\right| \xrightarrow{\varepsilon_{i-1}} \left|f'(x_{i-1})\right| \quad (14)$$

The Lyapunovexponent of a 1Dmap $x_{n+1} = f_\mu(x)$ is defined by equation (15):

$$\lambda_L(x) = \lim_{n\to\infty} \frac{1}{n}\sum_{i=1}^{n} ln\,|\,f'(x_k)\,| \quad (15)$$

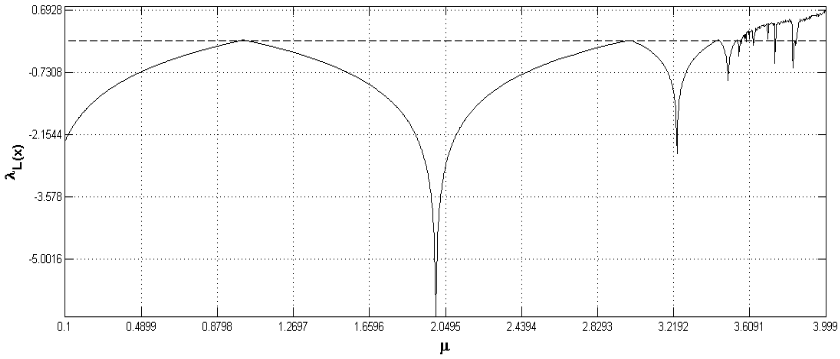

Figure 11. Lyapunov exponent for logistic map 0.1 ≤μ ≤ 3.999, N = 1500, x_0 = 0.1

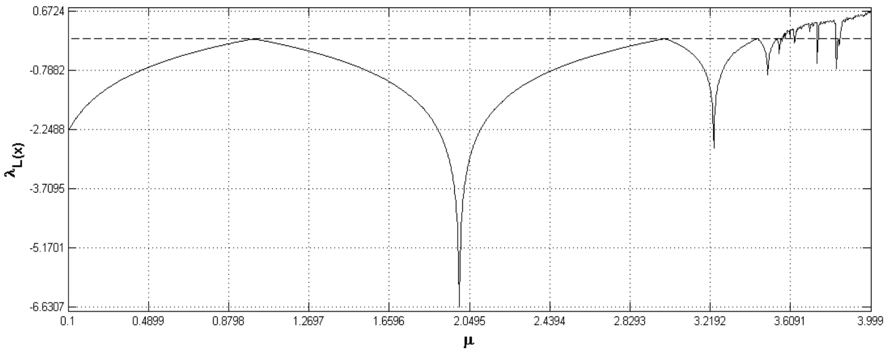

Figure 12. Lyapunov exponent for New logistic for 0.1 ≤μ ≤ 3.999, k=1000, N = 1500, x_0 = 0.1

The Figure 9 is not similar to Figure 10, which is the bifurcation diagram for the logistics map and the new logistic map. The two diagrams may also be different from one another. The iterative range of the chaotic new system is much more extensive than that of the logistic map. We can conclude that the parameter (μ) in formula 11 decides whether the system is chaotic or not and the parameters (μ, k) in formula 12 decides whether the system is chaotic or not. The Figure 11 and 12 are similar the x-label is the value of parameter μ and the y-label is the parameter $\lambda_L(x)$ value of the logistic function. Shown in Figure 11 that he value is onle when the parameter μ is close to 4, the Logistic Map is chaotic. And no matter what the parameter is μ and k. The new chaos system keeps chaotic.

The analysis from which has larger key space and iterant range and the result prove that the new chaos system has better performance than that of Logistic Map. It can be concluded that the new chaos system is better than Logistic Map and it can improve the security of the encryption system (see Figure 12).

The Lyapunov exponent (LE) here demonstrates the explanation of the chaotic diagrams.It is often used as a measure to form the chaos of a dynamic system. Simply stated, the LE characterizes the degree to which the path that start to diverge very close together in time. In a system with LE>0, the path diverges exponentially and thus the sensitive dependence exhibits system with respect to initial conditions (frequently cited as a defining characteristic of chaotic systems).In addition, if LE <0 the system is dispersive in the sense that the trajectory converging (the system of chaos is not chaotic below) and If LE = 0, the system is conservative.

4. Method Bit - Chaotic Sequence

A main difference between the chaotic sequence and Gold sequence is that chaotic sequences produced are not binary. Therefore the chaotic sequences are used to be transformed into binary orders. To transfer the chaotic order to actual values x the binary sequence provides methods for producing bit chaotic sequence. We proposed effective method to produce different sequences of binary random variables for some logistic map simultaneously. The principle of The proposed method consists of the following steps: First, the sequence $\{x_k\}$ is generated by the chaotic new chaotic map logistics method, which must be amplified by a scale factor (10^2) and round to integer subsequence ⌊ f (x) according ⌋ method the following equations *Round* or *Roundn* function in MATLAB software.

$$h(x) = \text{roundn}\left(\lfloor f(x) \rfloor, -n\right) \tag{16}$$

With n: number of places⌊ . ⌋: Whole number. In this paper we will take n = 2:

$$g(x) = \text{mod}\left(h(x)*10^2, 2\right) \tag{17}$$

We generate another $\{x_k\}$ pseudo-random sequence g_k of natural numbers *k*bit sequence given by the step:
Encodage sequence Chaotique binaire (LSB: Least SignificationBit)

$$B_k^{'} = G(x_k) = \begin{cases} 0 & \text{if} \quad g_k(x) \quad \text{pair} \\ 1 & \text{if} \quad g_k(x) \quad \text{odd} \end{cases} \tag{18}$$

And $k \in [0 \quad N]$, N : Iterations

Finally, the binary sequence $\{S_k\}_{k=0}^{\infty}$ of the algorithm is obtained by mixing the two sequences $\{B_k^{'}\}_{k=0}^{\infty}$ and $\{w_k\}_{k=0}^{\infty}$ using XOR operation. That is

$$\{S_k\}_{k=0}^{\infty} = \{B_k^{'}\}_{k=0}^{\infty} \oplus \{w_k\}_{k=0}^{\infty} \tag{19}$$

5. Simulation Procedure DS-SS

A digital DS-SS BPSK system is illustrated in Figure 3. The DS-SS system is simulated over an AWGN channel. By employing a modulation (BPSK), A system for short code is implemented by employing the same spreading sequence for each bit, the next period of the order is equal to Spreading Factor (SF). After spreading it gives the so-called channel bit is known as chips. In this study a DS-SS system is simulated over an AWGN channel: Additive

White Gaussian Noise Model. The simplest radio environment in which a wireless communications system or a local positioning system or proximity detector based on Time-of-flight will have to operate is the Additive-White Gaussian Noise (AWGN) [18], environment. Additive White Gaussian Noise (AWGN) is the commonly use to transmit the signal while signals travel from the channel and simulate the background noise of the channel.

5.1. Simulation Results

Performing a bit-error-rate BER simulation can be a lengthy process. We need to run individual simulations at each SNR(=E_B/N_0) of interest The simulated result is shown in Figure 3 and this shows that the DS-SS system simulated over an AWGN channel with the spread spectrum factor SF = 4 and8 has the same performance as the ordinary BPSK system.

1. The Bit Error Rate (BER)

The BER, or the quality of the digital link, is calculated from the number of bits received in error divided by the number of bits transmitted.

$$\mathrm{BER} = \left(\text{Bits in Error}\right) \ / \ \left(\text{Total bits received}\right). \quad (20)$$

In the digital transmission, the number of bit errors is the number of the received bits of a data stream over a communication channel that has been altered due to noise, interference, distortion or bit synchronization errors. The BER is the number of bit errors divided by the total number of transferred bits during a particular time interval and the BER is a unit less performance measure, often expressed as a percentage. The theoretical BER of detection logic BPSK over an AWGN channel is given by:

$$\mathrm{BER}_{\mathrm{theo}} = 1/2 * \mathrm{erfc}(\mathrm{sqrt}(\mathrm{SNR})) \quad (21)$$

2. The Bit Error Detection

The Bit Error Detection is also straight forward over an AWGN channel is given by two steps as follows:

Setup 1: Create Error Vector

The calculate the error vector, 'err', from the transmitted bit vector,'$\mathrm{X}_{\text{raw data}}$', and the received bit vector, '$\hat{\mathrm{X}}_{\text{detection}}$' as:

$$\mathrm{err} = \mathrm{X}_{\text{raw data}} - \hat{\mathrm{X}}_{\text{detection}} \quad (22)$$

Or $X_{raw\ data}$: is a binary data stream or is the transmitted bit vectorThe error vector 'err' contains non-zero elements in the locations where there werebit errors.

Setup 2: Calculate Bit-Error-Rate

We transmit and receive a fixed number of bits. We determine how many of the received bits are in error, and then compute the bit-error-rate as the number of bit errors divided by the total number of bits in the transmitted signal. We used to calculate the generated Bit Error Rate (BER) by using 'mean' function. The Bit Error Rate calculation can be seen in equation (23):

$$\mathrm{BER} = \mathrm{mean}\left(\frac{\mathrm{abs}\left(\mathrm{err}\right)}{2}\right) \quad (23)$$

With 'abs' function is used to find absolute valueerror vector, 'err',

5.2. Specifications and Performance

Let us use a DS-SS system the specifications considered for designs are listed out in Table 1.

Table 1. DS-SS system specifications.

Specifications	
Parameters	Value
SNR Eb/N0 (dB)	0~15
Spreading Factor (SF)	4,8,
canalization Code	Gold code ; new logistic map
New bit	Gold code conventional new logistic map
Length gold code	*Chips=31=2^5-1*
Nombre De Bit Transmis	Power (10,P) or P=5
Channel noise	AWNG
Modulation type	BPSK

Table 1 shows the parameters of simulation for the model of installation. By changing these, it will be possible to find the best combination to obtain more high efficiency of the PN sequence inside the DS-SS system.

(1) The Performance of DS-SS with Gold code and differing spreading factor for SF = 4, SF = 8 and *Chips = 31 = 2^5 - 1.* The results obtaind in Figure 13 and Figure 14.

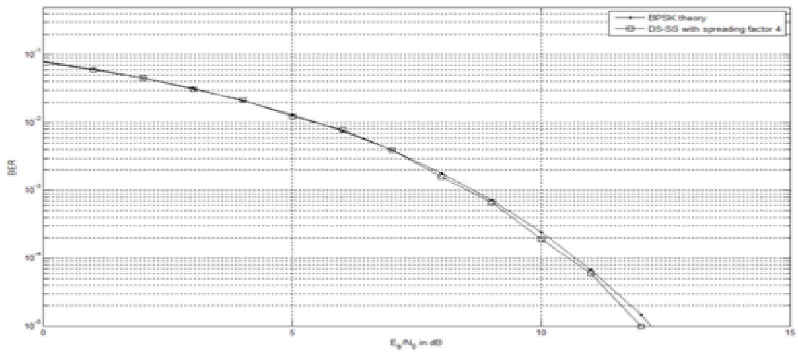

Figure 13. Bit error versus E_b/N_0 for Gold code and spreading factor (SF = 4)

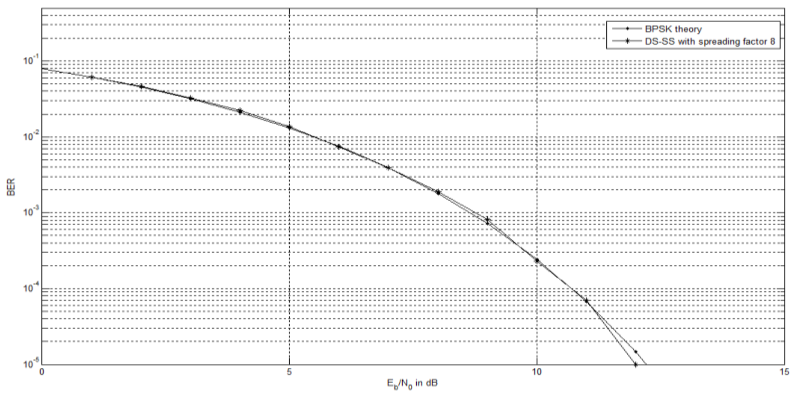

Figure 14. Bit error versus E_b/N_0 for Gold code and spreading factor (SF = 8)

Figures 13 and 14 show the thoretical versus simulated BER. It can be observed from the both figures that the simulated DS-SS system over an AWGN channel with the spreading factor 4 or 8 and has the same performance as the ordinary BPSK.

(2) Performance of DS-SS with the new algorithm to generate random RBSG bitscode (New logistics map and conventional sequence with Gold), and differing spreading factor for SF = 4, SF = 8. The results obtained in Figure 15 and Figure 16.

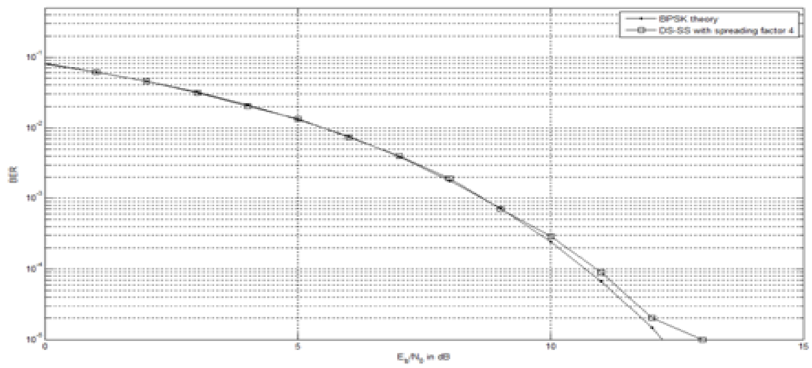

Figure 15. Bit error versus E_b/N_0 fornew binary code, SF = 4

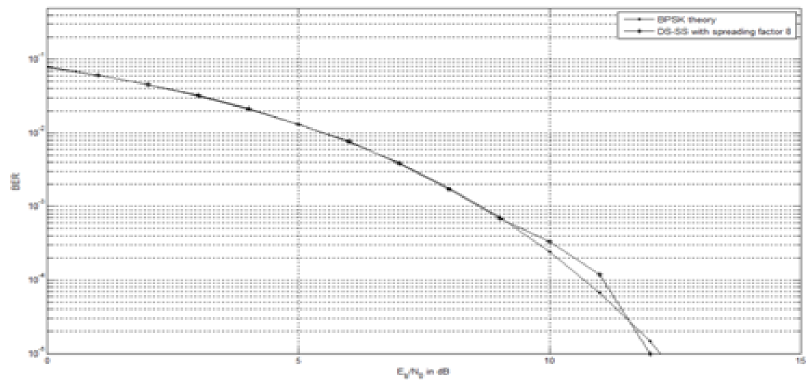

Figure 16. Bit error versus E_b/N_0 fornew binary code, SF = 8

In Figures 15 and Figure 16 are shown the results of the thoretical versus simulated BER. It can be observed from the both figures that the simulated DS-SS system over an AWGN channel with spreading factor 4 or 8 has the same performance as the ordinary BPSK. Observed in Figure 15 and 16 the effects of the PN code rate to the output bit error probability. The simulations showed that the PN signal rate had no significant effect improvement of bit error probability. It is seen that in the DS-SS to BER performance environment that the BER for SF = 8 is smaller relative to the BER at SF = 4, the increase in the spreading factor is a better performance in the system DS-SS. We can say that the DS-SS Systems SF = 8 outperforms system SF = 4 spreading factor.It is clear that this increases in the Gold code length SF factor and provides a significant improvement in performance power of a DS-SS system. The comparaison is made to show that the new sequence system has better performance than that of the Gold code. It can be concluded that the new code system is better than the gold code and can improve the security of encryption system.

6. Discussion the Security of System DS-SS

We can easily detect the DS-SS-BPSK. This aims to us a faithful security to start the recovering in the sense to succeed. The original date works in detecting the pseudo sequence chaotic in the best way. So this operation has equality in biting. Then it is sure possible for an intruder that this is an exact bit rate. There are also several methods which can maintain safely with Gold sequence and Gold sequence of the chaotic map. This is to explain our system which is combined with the DS-SS technics using the conventional system. Moreover the security has been compromised by burying chaotic map in the conventional DS-SS technics within the transmitted signals in its properties. This also means that the proposed systems inherit the security advantages of the conventional methods. Which explains that the security of the proposed data depends on the variation of the integration period based on the chaotic behavior. We denote that the chaotic behavior of the generation is so easy to send an authorized receiver which can complete information on the structure. This will make the detection difficult for an intruder because the chaotic regeneration system is covered by the Gold sequence generator. And when the chaotic behavior is sensitive in its dependence the very small error in the detection leads to errors growing exponentially in. In this case the detection of the variation of the duration of a bit is completely incorrect and the receiver operates in the state of synchronization. Finally the BER will have an increasing value then the unauthorized access is failed and which are proved by simulation results in figures 15 and 16.

7. Conclusion

Nowadays the Digital communication system Blocked Bits pseudo generator chaos based on the DS-SS is very important. They have the different strong point and are equally important. This is based on an unique combination of conventional techniques and Gold sequence of the new chaotic map and the data has used the proposed system and must be protected from eavesdroppers in the case the use of different methods. With the presence of the DS-SS classic technique in the proposed system, the transmitted signal has properties such as random noise and occupies a large bandwidth with a spectral density of very low power on the transmission channel. The structure of the transaction and the BER performance of the proposed system are described and intitled in the Middle of the theoretical analysis and the numerical simulation. This is the proposed system is the good spread spectrum on data protection in comparison with the equivalent conventional system. All these features make the system robust and feasible to provide the required security of the communication system based on the digital sense of DS-SS.

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