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Preface

The International Conference on Applied Sciences Mathematics and Informatics (ICASMI) is an annual conference hosted by University of Lampung that brings together academics, scholars and researchers from around the world to meet and exchange the latest ideas and discuss issues concerning all fields of sciences, mathematics, informatics and their application. It also allows representatives of industry, government employers and postgraduate students to have an opportunity to discuss with experts on some issues they concern.

The theme for ICASMI 2018: "The Contribution of Sciences on Sustainable Valorization of Natural Resources" is to highlight the role of sciences tackling problems and creating synergies with other fields on sustainable valorization of natural resources. The conference will provide researchers and scientists from mathematics and computer science, researchers from various application areas such as physics, chemistry, life sciences, and engineering, as well as in education and social fields, to discuss problems and solutions in the area, to identify new issues, and to shape future directions for research.

We would like to acknowledge all of those who have supported ICASMI 2018. Each individual and institutional help were very important for the success of this conference. Especially we would like to thank the organizing committee for their valuable advices in the organization and helpful peer review of the papers.

We hope that ICASMI 2018 will be a forum for excellent discussions that will put forward new ideas and promote collaborative researches. We are sure that the proceedings will serve as an important research source of references and the knowledge, which will lead to not only scientific and engineering progress but also other new products and processes.

Dr. Junaidi, M.Sc.

Peer review statement

All papers published in this volume of *Journal of Physics: Conference Series* have been peer reviewed through processes administered by the proceedings Editors. Reviews were conducted by expert referees to the professional and scientific standards expected of a proceedings journal published by IOP Publishing.





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Important Dates

Registration Schedule

Deadline for abstract submission	July 22 th , 2018
Notification of acceptance	June 10 th - July 26 th , 2018
Registration payment (presenter)	August 2 nd , 2018
Registration payment deadline (non presenter)	August 2 nd , 2018
Conference	August 9 th - 11 th , 2018
Deadline for full paper	August 31 st , 2018

Conference Schedule

• August 9, 2018

Time	Activities
07.30 am	Registration
08.30 am	Opening Ceremony
08.40 am	Indonesian National Anthem
08.45 am	Al-Qur'an Recitation
08.55 am	Traditional Dance

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C2018	Poster Session Q =					
(https://icasmi.fm 30.pm /2018/)	ipa.unila.ac.id Lunch Break					
01.00 pm	Parallel Session 4					
	Room A: Chemistry and Applied Chemistry					
	Room B: Biology and Applied Biology					
	Room C: Mathematics and Applied Mathematics					
	Room D: Informatics and Computer Science					
	Room E: Physics and Applied Physics					
03.00 pm	Coffee Break					
03.15 pm	Parallel Session 5					
	Room A: Chemistry and Applied Chemistry					
	Room B: Biology and Applied Biology					
	Room C: Mathematics and Applied Mathematics					
	Room D: Informatics and Computer Science					
	Room E: Physics and Applied Physics					
04.15 pm	Photo session & Closing remark					
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The Implementation of Digital Text Coding Algorithm Through A Three Dimensional Mapping Derived From Generalized -mKdV Equation Using Mathematica

Notiragayu¹ and L Zakaria¹

¹ Mathematics Department, University of Lampung, Bandar Lampung, Indonesia

Abstract. Encryption-decryption algorithm using a mapping can be done for encoding a digital text, such as two dimensional mapping -sine Gordon equation. In this article, we will be given an encryption-decryption algorithm to a digital text through a three dimensional mapping that derived from the generalized -mKdV equation. Implementation of Encryption-decryption algorithm in this article using MATHEMATICA.

1. Introduction

Cryptography is an attempt to secure digital data files (etc. text and images). Cryptography, based on security keys, can be classified into two types of keys, symmetric keys and asymmetric keys [1].

An efficient and effective encryption-decryption algorithm is a necessity in cryptography for data security. A simple encryption-description algorithm is implemented into a computer programming and produces a high degree of difficulty in finding the security key for opening the data is an absolute thing in Cryptography. Encryption-decryption algorithm which involves mathematics in it can be found in ElGamal's article (1985) and the articles in the reference [2].

Among Cryptographic encryption-decryption algorithms that use mathematical concepts, there is a Cryptographic encoding algorithm that involves mapping. For encoding in an image for example, Rinaldi (2012) has introduced the use of Arnold Cat Map (ACM) linear mapping [3]. Meanwhile, Arinten and Hidayat (2017) use Logistic Map (LM). Likewise with Ronsen, Arwin, and Indra (2014), they used ACM and Nonlinear Choatic Algorithm (NCA) in coding for an image [4,5]. Thus a mapping can be used as a means of building cryptographic encoding for a digital data (image).

With regard to digital text data, popular cryptographic algorithms used are public key algorithms, commonly referred to as asymmetric keys, for example the ElGamal public key [6]. While the use of a mapping for cryptographic algorithms text data is relatively little published.

In this article, we will discuss an application of map in cryptographic algorithms for text data. The mapping is a part of the nonlinear mapping derived from a generalized traveling wave solution - mKdV [7].

This article is divided into four sections. In the first section an illustration of a descriptive algorithm is provided for cryptographic coding of text data using a 2-dimensional periodic nonlinear method. The second part, in the form of case studies, discusses cryptographic algorithms of text data using 2-dimensional mapping derived from the equation of a generalized traveling wave solution - sine Gordon. In the third part, the implementation of the cryptographic algorithm of text data into the Mathematic programming language. In the fourth section, the conclusions are briefly described in the results obtained in the previous section.

(1)

2. Encryption-Decryption Algorithm For Digital Text Submission Using Mapping: An Ilustration Consider the following nonlinear mapping:

where

 $\mathbf{g} : \mathbb{R}^2 \qquad \mathbb{R}^2$ $(x, y) \mapsto \frac{1}{x y}, x .$

It can be examined that equation (1) is a 3-periodic nonlinear mapping with the parameter values and set as any but not zero.

Example:

Consider the following text data.

FromWolfram: Mathematica's ex extensive base of state-of-the-art algorithms, efficient handling of very long integers, and powerful built-in language make it uniquely suited to both research and implementation of cryptographic number theory.

We are coding the text data using mapping (1) whose symmetrical key is selected from and . Descriptively, the encryption-decryption algorithm for example text like this can be done in the following way.

2.1. Encryption stage

- 1. Grouping Text into two parts, for example parts x(n) and y(n) with $n \, N$ are the values of numeric data associated with text data. And assume the length of the text data l is the same that is $l(x) \, l(y) \, m \, \mathbb{N}$.
- 2. Convert text data to numeric data. The ASCII code can be used or uses a self-made encoding.
- 3. Do the mapping iteration process as much as r times with the provisions of $g^0 = g^r$; $r = \mathbb{N}$.
- 4. Select the parameter value , 0 and make it as the key value.

2.2. Decryption Stages

1. Reuse the parameter value , 0 which is the key value at encryption.

2. Perform the mapping iteration process provided until it reaches the r iteration, that is g^r ; $r \in \mathbb{N}$.

3. Convert numeric data into text data.

4. Finish.

The implementation of the descriptive algorithm above using Mathematica is given in the next section.

3. Digital Text Description-Encryption Algorithm Using A Mapping Derived From Generalized -mKdV Equation

3.1. The 2-Dimensional Periodic Mapping Formulation Derived from Generalized -mKdV Equation

In this section, we will follow a technique for a generalized sine-Gordon equation (see [8]). Look at the family of four mapping parameters derived from the generalized -mKdV equation follows:

$${}_{1}V_{l,m}V_{l,m-1} = {}_{2}V_{l-1,m}V_{l-1,m-1} = {}_{3}V_{l,m}V_{l-1,m} = {}_{4}V_{l,m-1}V_{l-1,m-1} = 0,$$
⁽²⁾

with 1 1 2p, 2 4 2p, 3 2 1q and 4 2 4q. Using the following transformation

$$V_{l,m} \quad V_n$$
 where $n \quad z_1 l \quad z_2 m$,

where the parameter values of z_1 and z_2 are relatively prime integers, we can reduce the form of the current wave solution (2), namely

$${}_{1}V_{n}V_{n \ z_{2}} \qquad {}_{2}V_{n \ z_{1}}V_{n \ z_{1}} \qquad {}_{2}V_{n \ z_{1}}V_{n \ z_{1}} \qquad {}_{3}V_{n}V_{n \ z_{1}} \qquad {}_{4}V_{n \ z_{2}}V_{n \ z_{1} \ z_{2}} \qquad 0$$
(3)

Equation (3) is a form of traveling wave solution from -mKdV. It can be examined that the equation (3) is invariant for a transformation $z_1^{\mathsf{TM}} \quad z_1, p^{\mathsf{TM}} \quad p$, and $z_1 \,\check{\mathbf{S}} \quad z_2$. Besides that it also fulfills the periodic nature, namely $i \quad z_2, j \quad z_1$. Equation (3) is equivalent to mapping

$$V_{z_{1} \ z_{2} \ 1}^{'} = \frac{V_{0} \ 3}{4} V_{z_{1}} \ 1}{4} V_{z_{2}} \ 2} V_{z_{1}}^{'}$$

$$V_{z_{1} \ z_{2} \ 2}^{'} = V_{z_{1} \ z_{2} \ 1}$$

$$\vdots$$

$$V_{1}^{'} \ V_{2}$$

$$V_{0}^{'} \ V_{1} \ \%$$

$$(4)$$

Select $z_1 = 1$ and $z_2 = 2$. The third order difference equation of equation (4) can be stated as follows:

$$_{1}V_{n}V_{n}_{2}$$
 $_{2}V_{n}_{1}V_{n}_{3}$ $_{3}V_{n}V_{n}_{1}$ $_{4}V_{n}_{2}V_{n}_{3}$ 0

which is equivalent to the following three-dimensional mapping:

$$V_{n 2} = \frac{V_{n 3}V_{n 2} V_{n 1}}{4V_{n 1} 2V_{n 2}}$$

$$V_{n 1} V_{n 2}$$

$$V_{n V_{n 1}}$$
(5)

The equation in (5) is usually given a three-dimensional mapping derived from the generalized -mKdV equation.

Look at equation (5). Suppose that $_n$ is a line in \mathbb{R}^2 that is defined as

$$\frac{V_{n-2}}{V_{n-1}}$$
ⁿ

$$\frac{V_{n-1}}{V_n}$$

Suppose that is a parameter vector in \mathbb{R}^4 : (1, 2, 3, 4). Therefore, three-dimensional statements can be reduced to a two-dimensional mapping, namely:

$$n_{n-1} \mathbf{g}(n)$$

where

$$\mathbf{g} : \mathbb{R}^2 \qquad \mathbb{R}^2 \qquad (x, y) \mapsto \frac{1}{xy} \frac{3^{x-1}}{2^{x-4}}, x \qquad (6)$$

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where $y = \frac{V_{n-1}}{V_n}$ and $x = \frac{V_{n-2}}{V_{n-1}}$. It can be checked that the mapping in equation (6) has an integral

(there is a function $S:\mathbb{R}^2$ \mathbb{R} so that $S(n_1)$ $S(n_2)$ for all $n \mathbb{N}$) [8]. If $\frac{-1}{4}$, $\frac{-2}{4}$, and

 $\frac{3}{3}$, then the map in equation (6) can be written as

$$\mathbf{g}_{,,} : \mathbb{R}^2 \qquad \mathbb{R}^2 \qquad (x, y) \mapsto \frac{1}{xy} \frac{1}{x \cdot 1}, x \quad (7)$$

3.2. Implementation of Digital Text Data Encryption Algorithms Based on 2-Dimensional Mapping Using Mathematica

To implement a cryptographic algorithm into a computer program, a number of software can be used, such as *Matlab* and *Mathematica*. In this article, we will use *Mathematica* that its rules and technical writing of this program in full in a reference written by Shifrin (2008) [9].

Look at the descriptive algorithms presented in section two. Against the text and 4-periodic mapping given in that section, the implementation of algorithms using Mathematica is as follows.

str1 = "From Wolfram: Mathematica's extensive base of state-of-the-artal gorithms,"

efficienthandlingofverylongintegers, ";

str2="andpowerfulbuilt-inlanguagemakeituniquelysuitedtobothresearchand implementationofcryptographicnumbertheory.";

 $\begin{aligned} StringLength[str1] \\ StringLength[str2] \\ A = ToCharacterCode[str1]; \\ B = ToCharacterCode[str2]; \\ AccountingForm[Grid[Partition[A,10]]]; \\ AccountingForm[Grid[Partition[B,10]]] \\ x = A; y = B; r = 3; = 0.0001523; \\ \end{aligned}$

THIS SECTION IS A SUBRUTIN PROGRAM NAMED coding1 FOR ITERATION PROCESSES g (A, B) TO THE r- ITERATION.

xx=SetPrecision[coding1[[r-1,2]],10]; yy=SetPrecision[coding1[[r-1,1]],10]; AccountingForm[Grid[Partition[xx,5]]]; AccountingForm[Grid[Partition[yy,5]]];

THIS PART IS A SUBRUTIN PROGRAM NAMED recoding 1 FOR ITERATION PROCESSES g^{-1} (AA, BB) TO R-ITERATION.

Flatten[*FromCharacterCode*[*Round*[*recoding1*[[*r* –1]]]]]

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Figure 1. Conversion results of text data A (left) and B (right) to numerical data before the mapping iteration process is carried out (g^0) .

Figure 1 shows the result of the conversion of program outputs text data into numerical data using ASCII code (based on g^0). Another output of the program, for parameter values 0.0001523 and 8.1037277, we have the following numerical data.

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Figure 2.The results of the conversion of text data to numeric data with the choice of parametervalues0.0001523 and8.1037277, after the iteration of the mapping (7) process is carriedout on g^2 g^2

3.3. Encryption-Description Algorithm For Setting Digital Text Using Mapping Generalized mKdV Equation

Review the implementation of the algorithm using Mathematica which was given in the previous section. By using the transparent properties found in mapping (6), the periodic mapping iteration process can be replaced by an iteration invers mapping process, namely:

THIS SECTION IS A SUBRUTIN OF NAMED recoding1 PROGRAMS FOR ITERATION PROCESSES g^{-1} (AA, BB) TO r-ITERATION.

Flatten[*FromCharacterCode*[*Round*[*recoding1*[[*r* –1]]]]].

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Figure 3. The results of the conversion of text data to numeric data with the value of the choice parameter 0.05234, = 0.7125, and = 6.7111, after the iteration of the mapping (7) process is carried out on g^9 .

With algorithms and implementation of similar algorithms, for mapping (7) with a choice of key values in the form of the choice parameter value = 0.05234, = 0.7125, = 6.7111 as given in figure 3.

4. Conclusion

From the results obtained and discussed in the previous section, it can be concluded that the 3dimensional mapping reduced to 2-dimensional mapping derived from the ______-mKdV equation can be used to design a text cryptography relatively easily. As the purpose of cryptography is data security, then the choice of a reversible mapping option can be used as an alternative choice of digital text encoding with a symmetric key selected non-zero parameter values. The results of this study, because the statement involved is a mapping that is reversing symmetry, then for the mapping and procedure of cryptographic algorithms used for an image, the request requires a measure preserving nature, and this will be an interesting advanced topic to study.

Acknowledgments

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References

- [1] Sadikin R 2012 Kriptografi untuk Keamanan Jaringan (Yogyakarta: Andi Publisher) p 392
- [2] El Gamal T 1985 A Public key crypto system and a signature scheme based on discrete logarithms *IEEE Transactions On Information Theory* **31** 4 pp 469-472
- [3] Rinaldi M 2012 A selective encryption algorithm for digital images in the frequency domain based on chaos mutations *Electrical Engineering Journal* **10** 2 pp 66-72
- [4] Arinten D H and Irawan A 2017 Digital image cryptography system on an intranet network using the method of combining chaos maps and selective techniques *Ultimatics* **9** 1 pp59-66
- [5] Ronsen P, Arwin H and Indra S 2014 Encryption of digital images using Arnolds map paint and nonlinear chaotic algorithm *Mikroskil SIFO Journal* **15** 2 pp 61-71
- [6] Al-Anshori F and Ariwibowo E 2014 Implementation of elGamal's public key cryptographic algorithm for encryption and decryption processes for securing data files *Journal of Undergraduate Engineering* 2 2 pp 1-10
- [7] Zakaria L, Notiragayu, A Nuryaman dan S Suharsono 2018 The integral normal form of a three dimensional traveling wave solution mapping derived from generalized -mKdV equation Advances in Differential Equations and Control Processes 19 1 pp 37-4
- [8] Zakaria L and Tuwankotta J M 2016 Dynamics and bifurcations in a two-dimensional maps derived from a generalized -sine Gordon equation *Far East Journal of Dynamical Systems* 28 3 pp 165-194
- [9] Shifrin L 2008 Mathematica® Programming: an Advanced Introduction, Part I: the core language (California: Wolfram Media Inc) pp 408