

# Full-Time-Pad Symmetric Stream Cipher

## Improved One-Time-Pad Encryption Scheme

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## **Abstract**

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# 1 Introduction

## 1.1 Pre-requisite Terminology

## 1.2 Applications

## 1.3 Key Generation

## 1.4 Prerequisite Mathematics

## 1.5 Vector Permutation

# 2 Security Vulnerabilities

## 2.1 Brute-Force

### 2.1.1 Birthday Attack

### 2.1.2 Denial of Service (DoS)

## 2.2 Reverse Engineering the Transformation

## 2.3 Collision-Resistance

### 2.3.1 Different Permutation Matrices

### 2.3.2 Number of Rounds

### 2.3.3 Constant - $F_p$ - Prime Galois Field Size

### 2.3.4 Constant - $r$ - Dynamic Rotation Constant

# 3 Hashing

## 3.1 Diffusion - Permutation

### 3.1.1 Vector Permutation

### 3.1.2 Dynamic vs. Static

## 3.2 Dynamic Matrix Permutation

### 3.2.1 Derivation

### 3.2.2 Other Options

## 3.3 Confusion - ARX

### 3.3.1 A - Modular Addition

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### 3.3.2 R - Bitwise Rotation

### 3.3.3 X - XOR

## 3.4 Key Transformation

# 4 Cipher

## 4.1 Transformation