

# Table of Contents

## Block Cipher Cryptanalysis

Cryptanalysis of IDEA-X/2 .....	1
<i>Håvard Raddum (University of Bergen)</i>	
Differential-Linear Cryptanalysis of Serpent .....	9
<i>Eli Biham, Orr Dunkelman, and Nathan Keller (Technion)</i>	
Rectangle Attacks on 49-Round SHACAL-1 .....	22
<i>Eli Biham, Orr Dunkelman, and Nathan Keller (Technion)</i>	
Cryptanalysis of Block Ciphers Based on SHA-1 and MD5 .....	36
<i>Markku-Juhani O. Saarinen (Helsinki University of Technology)</i>	
Analysis of Involutional Ciphers: Khazad and Anubis .....	45
<i>Alex Biryukov (Katholieke Universiteit Leuven)</i>	

## Boolean Functions and S-Boxes

On Plateaued Functions and Their Constructions .....	54
<i>Claude Carlet and Emmanuel Prouff (INRIA)</i>	
Linear Redundancy in S-Boxes .....	74
<i>Joanne Fuller and William Millan (Queensland University of Technology)</i>	

## Stream Cipher Cryptanalysis

Loosening the KNOT .....	87
<i>Antoine Joux and Frédéric Muller (DCSSI Crypto Lab)</i>	
On the Resynchronization Attack .....	100
<i>Jovan Dj. Golić (Telecom Italia Lab) and Guglielmo Morgari (Telsy Elettronica e Telecomunicazioni)</i>	
Cryptanalysis of SOBER-t32 .....	111
<i>Steve Babbage (Vodafone Group Research &amp; Development), Christophe De Cannière, Joseph Lano, Bart Preneel, and Joos Vandewalle (Katholieke Universiteit Leuven)</i>	

## MACs

OMAC: One-Key CBC MAC .....	129
<i>Tetsu Iwata and Kaoru Kurosawa (Ibaraki University)</i>	

## VIII Table of Contents

A Concrete Security Analysis for 3GPP-MAC .....	154
<i>Dowon Hong, Ju-Sung Kang (ETRI), Bart Preneel (Katholieke Universiteit Leuven), and Heuisu Ryu (ETRI)</i>	
New Attacks against Standardized MACs .....	170
<i>Antoine Joux, Guillaume Poupard (DCSSI), and Jacques Stern (Ecole normale supérieure)</i>	
Analysis of RMAC .....	182
<i>Lars R. Knudsen (Technical University of Denmark) and Tadayoshi Kohno (UCSD)</i>	

## Side Channel Attacks

A Generic Protection against High-Order Differential Power Analysis .....	192
<i>Mehdi-Laurent Akkar and Louis Goubin (Schlumberger Smart Cards)</i>	
A New Class of Collision Attacks and Its Application to DES .....	206
<i>Kai Schramm, Thomas Wollinger, and Christof Paar (Ruhr-Universität Bochum)</i>	

## Block Cipher Theory

Further Observations on the Structure of the AES Algorithm .....	223
<i>Beomsik Song and Jennifer Seberry (University of Wollongong)</i>	
Optimal Key Ranking Procedures in a Statistical Cryptanalysis .....	235
<i>Pascal Junod and Serge Vaudenay (Swiss Federal Institute of Technology, Lausanne)</i>	

Improving the Upper Bound on the Maximum Differential and the Maximum Linear Hull Probability for SPN Structures and AES ..	247
<i>Sangwoo Park (National Security Research Institute), Soo Hak Sung (Pai Chai University), Sangjin Lee, and Jongin Lim (CIST)</i>	

Linear Approximations of Addition Modulo $2^n$ .....	261
<i>Johan Wallén (Helsinki University of Technology)</i>	

Block Ciphers and Systems of Quadratic Equations .....	274
<i>Alex Biryukov and Christophe De Cannière (Katholieke Universiteit Leuven)</i>	

## New Designs

Turing: A Fast Stream Cipher .....	290
<i>Gregory G. Rose and Philip Hawkes (Qualcomm Australia)</i>	

Rabbit: A New High-Performance Stream Cipher .....	307
<i>Martin Boesgaard, Mette Vesterager, Thomas Pedersen,     Jesper Christiansen, and Ove Scavenius (CRYPTICO)</i>	
Helix: Fast Encryption and Authentication in a Single Cryptographic Primitive .....	330
<i>Niels Ferguson (MacFergus), Doug Whiting (HiFn), Bruce Schneier (Counterpane Internet Security), John Kelsey, Stefan Lucks (Universität Mannheim), and Tadayoshi Kohno (UCSD)</i>	
PARSHA-256 – A New Parallelizable Hash Function and a Multithreaded Implementation .....	347
<i>Pinakpani Pal and Palash Sarkar (Indian Statistical Institute)</i>	
<b>Modes of Operation</b>	
Practical Symmetric On-Line Encryption .....	362
<i>Pierre-Alain Fouque, Gwenaëlle Martinet, and Guillaume Poupard (DCSSI Crypto Lab)</i>	
The Security of “One-Block-to-Many” Modes of Operation .....	376
<i>Henri Gilbert (France Télécom)</i>	
<b>Author Index</b> .....	397