Notice of the Final Oral Examination
for the Degree of Doctor of Philosophy

of

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MSc (Alexandria University, 1999)
BSc (Alexandria University, 2009)

“Secure Communications Based on Chaotic Systems”

Department of Electrical and Computer Engineering

Monday, November 16, 2015
1:30 PM
Engineering and Computer Science Building
Room 468

Supervisory Committee:
Dr. T. Aaron Gulliver, Department of Electrical and Computer Engineering, University of Victoria (Supervisor)
Dr. Mihai Sima, Department of Electrical and Computer Engineering, UVic (Member)
Dr. Andrew Rowe, Department of Mechanical Engineering, UVic (Outside Member)

External Examiner:
Dr. Vicky Zhao, Department of Electrical and Computer Engineering, University of Alberta

Chair of Oral Examination:
Dr. Li-Shih Huang, Department of Linguistics, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies
Abstract

This dissertation provides methods to utilize chaos efficiently in secure communications. Chaos has many desirable characteristics such as ergodicity and sensitivity to initial conditions, and is considered an ideal candidate for use in cryptography and secure communications. On the other hand, it suffers from sensitivity to noise and fading if it is used for physical layer transmission, and errors due to the finite precision of the numerical algorithms in digital systems. This limits the use of chaos in cryptographic applications. Accordingly, the dissertation proposes new algorithms to enhance the security of modern communication systems using chaos. The focus is on developing chaotic cryptosystems for wireless systems that are reliable, secure, and have good performance.