University of Victoria | Graduate Studies

Notice of the Final Oral Examination
for the Degree of Master of Applied Science

of

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BS (Syed Babr Ali School of Science and Engineering, 2014)

# "Extended Delivery Time Analysis of Opportunistic Secondary Packet Transmission over Multiple Primary Channels"

Department of Electrical and Computer Engineering

Friday, September 8, 2017
10:00 A.M.
Engineering and Computer Science Building
Room 467

Supervisory Committee:
Dr. Hong-Chuan Yang, Department of Electrical and Computer Engineering, University of Victoria (Supervisor)
Dr. Lin Cai, Department of Electrical and Computer Engineering, UVic (Member)

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Dr. Esther Sangster-Gormley, School of Nursing, UVic

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## Abstract

Cognitive radio (CR) is one of the most prominent technique to deal with the radio spectrum scarcity problem. CR systems can improve radio spectrum utilization by opportunistically accessing the underutilized spectrum resource of the licensed users. In interweave implementation, the secondary user (SU) has to wait and locate spectrum holes before its transmission. Therefore, the extended delivery time (EDT) for the secondary user consist of both wait sots and transmission slots. We study the EDT analysis of fixed size secondary packet transmission over multiple primary channel. In particular, we introduce a birth-death based approach to model the cognitive transmission of the secondary user over multiple primary channels. We use this approach to derive the exact probability density function and probability mass function of EDT of the secondary transmission for both continuous and periodic sensing cases. We also present selected numerical and simulation results to verify our analytical approach and to illustrate the mathematical formulation.