



**University
of Victoria**

Graduate Studies

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

of

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MSc (Memorial University of Newfoundland, 2008)
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“Chronological Rectangle Digraphs”

Department of Mathematics and Statistics

Thursday, November 26, 2015

2:00 P.M.

David Turpin Building

Room A144

Supervisory Committee:

Dr. Jing Huang, Department of Mathematics and Statistics, University of Victoria (Supervisor)

Dr. Gary MacGillivray, Department of Mathematics and Statistics, UVic (Member)

Dr. Kieka Mynhardt, Department of Mathematics and Statistics, UVic (Member)

Dr. Ulrike Stege, Department of Computer Science, UVic (Outside Member)

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Dr. Fábio Protti, Institute of Computing, Fluminense Federal University

Chair of Oral Examination:

Dr. Olaf Niemann, Department of Geography, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

Interval graphs admit elegant ordering and structural characterizations. A natural digraph analogue of interval graphs, called chronological interval digraphs, has recently been identified and studied.

We introduce the class of chronological rectangle digraphs, and show that they are a higher dimensional analogue of chronological interval digraphs. A main goal of this thesis is to establish a foundation of knowledge about this class, including basic properties and an ordering characterization. Our most significant result is a forbidden induced subdigraph characterization for the series-parallel digraphs which are chronological rectangle. We also discuss obtaining chronological rectangle digraphs from orientations of graphs.

In addition we introduce the related concept of the chronological interval dimension of a digraph, and determine the digraphs for which it is defined. Unit and proper chronological rectangle digraphs, defined analogously to unit and proper interval graphs, are also introduced and studied.