The Hong Kong University of Science and Technology

Department of Mathematics

<u>Seminar on Applied Mathematics</u>

Deadlock Detection in MPI Programs Using Static Analysis and Symbolic Execution

by

Prof. Craig DOUGLAS &
Mr. Krishanthan KRISHNAMOORTHY
University of Wyoming

Abstract

Parallel computing using MPI has become ubiquitous on multi-node computing clusters. A common problem while developing parallel codes is determining whether or not a deadlock condition can exist. Ideally we do not want to have to run a large number of examples to find deadlock conditions through trial and error procedures. In this paper we describe a methodology using both static analysis and symbolic execution of a MPI program to make a determination when it is possible. We note that using static analysis by itself is insufficient for realistic cases. Symbolic execution has the possibility of creating a nearly infinite number of logic branches to investigate. We provide a mechanism to limit the number of branches to something computable. We also provide examples and pointers to software necessary to test MPI programs.

Date:	**Tuesday, 13 March 2018**
Time:	**4:00p.m. – 5:00p.m.**
Venue:	**Room 1504, Academic Building (near Lifts 25 & 26), HKUST**

All are welcome!