Canada-China Workshop on Industrial Mathematics

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1 Overview

Industrial mathematics was identified as one of the main areas for further collaboration during the Canada-China Congress in Mathematics, held at the University of British Columbia in 2001. After the congress, the MITACS NCE in Canada and the Mathematics Center of the Ministry of Education (MCME) in China started a pilot program. About 10 young Chinese mathematicians were invited by MITACS, and selected by MCME from top Chinese universities to joint MITACS teams and work with Canadian researchers, for a period of six months. The purpose of this program was to jump-start the Chinese industrial mathematics program by training young and promising Chinese mathematicians in a collaborative environment such as the one found within a MITACS projects, where a team of mathematical scientists carry out applied researches relevant to industry. All the participants of the program found the experience rewarding and expressed strong desire to continue collaborations started by this pilot program.

The Canada-China Workshop in Industrial Mathematics was organized after the successful conclusion of the MITACS-MCME pilot program. The objectives of the workshop are to provide a platform for the participants to 1. exchange ideas and insights on the development of industrial mathematics in both countries; 2. assess the success of existing collaboration between the two countries; 3. discuss future directions. In order to achieve these goals, we have invited prominent mathematical scientists as well as young researchers in both countries to show case their researches at the BIRS workshop. Round-table discussions were also organized for the participants to provide their insights and exchanges ideas on the development of industrial mathematics program in both countries.

2 Presentation Highlights

In the true spirit of industrial mathematics, presentations at the BIRS workshop cover a wide range of topics. Ian Friggard (UBC) gave an excellent talk on the relevance of mathematical modeling in the oil industry. He showed that simple models can go a long way in providing extremely useful insights in practical problems faced by the industry. In addition, he also showed that interesting mathematical problems arise naturally from the modeling exercises, which are nontrivial [4]. Yongji Tan (Fudan) presented an efficient method for solving the well-logging problem also used in the oil industry [1]. Ping Yan (Health Canada) gave a very informative lecture on the application of mathematical theory and stochastic models to the prediction of infectious diseases while Jianhong Wu (York) shared success stories of applying mathematical models during the SARS outbreak both in Canada and in China [7]. Guanghong Ding (Fudan) gave a very interesting overview of the

modeling efforts related to the traditional Chinese medicine, by incorporating biophysical mechanisms [5]. Christian Reidys (Nankai) reported the modeling work on bioinformatics done at the Center for Mathematical Biology in Nankai University. Nilima Nigam (McGill) present a case study on how mathematics and medicine can work together on predicting the bone remodeling [3]. Matt Davison (UWO) showcased the results from his MITACS project on modeling finance risk [8]. Shige Peng (Shandong) summarized his recent work on risk measure in finance and G-Brownian motion [2]. Evangelos Kranakis (Calton) presented modeling and computation on global communication in ad hoc networks. Sean Bohun (UOIT) summarized the MITACS funded work on crystals growth with a Canadian company Firebird [6].

3   Outcome of the Meeting

To build on the success of the pilot program, workshop participants have identified several directions for further developing the collaborations between Canada and China in the area of industrial mathematics. First of all, it was proposed that future collaborations should be focused on areas which are important to both countries, such as mathematical finance. Secondly, it was emphasized that the collaborations should be mutually beneficial. Finally, the collaborations should be built to take advantages of the strength of each country.

The workshop participants have also set milestones and developed strategies for followup activities. It was proposed that specific workshops in the areas of mathematical finance and biology to be held in the near future in Toronto [9]. It was also proposed that a industrial problem solving workshop in finance be jointly organized and held in China [10]. Both MITACS and MCME will develop joint programs and workshops in disease modeling and in other areas identified at and after the BIRS workshop.

References

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[9] MITACS-MCME Workshop on Risk Analysis, York University, Toronto, Dec 11, 2007.(http://www.apmaths.uwo.ca/m̃davison/research/ca_cn/).

[10] China-Canada Quantitative Finance Problem Solving Workshop, Weihai, China, Oct 5-10, 2008. (http://rida.sdu.edu.cn/weihai_workshop/index.html).