



SMS Nanning and RWTH Aachen: In Memory of Vladimir Gerdt

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In early January 2021, an e-mail message was sent from Anton, son of Vladimir P. Gerdt, telling us that Vladimir passed away due to covid-19 complications. I was completely shocked by this sad news: it was only a few weeks ago, in late November 2020, when I wrote a letter of recommendation for him to apply for a high-level position at the Peoples' Friendship University of Russia, Moscow, and before that we had several communications concerning the schedule of the third part of a short course he planned to teach at Guangxi University for Nationalities (GXUN) in Nanning, China. The course, initially scheduled for spring 2020, had been postponed because of the uncertainty of the pandemic situation. I cannot believe that we will no longer be able to meet our beloved Vladimir and we will have no more opportunity to hear his inspiring lectures!

In 2014, Jinzhao Wu, an academic brother of mine under Professor Wen-tsün Wu, invited me to GXUN to help enforce scientific research, graduate education, and academic cooperation there in Nanning, Guangxi Zhuang Autonomous Region, in the areas of intersection between mathematics and information sciences. The region Guangxi is located in the southern part of China near Vietnam and is renowned for its scenic rivers and mountains, rich natural resources, and minority cultures and traditions. Nanning, the capital of Guangxi, is a green city with warm climate and the GXUN campus is full of exotic trees and flowers with students of diverse nationalities. One of my projects at GXUN was to explore the potential of making profit from the special environment of human-nature interactions in Guangxi to build up a center of exchange for inspiring original ideas out of great minds of scientists. With some effort, the center was created under the name of Scientist Mobility Station | SMS International.

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My SMS initiative in Nanning was strongly supported by GXUN and a number of international colleagues. Among them Vladimir P. Gerdt is one of the most involved; other dedicated ones include Hoon Hong, Ilias S. Kotsireas, and Chee K. Yap. These colleagues are well known in the symbolic computation community for their leading roles. They have been actively mobilizing around SMS and stopped over there several times in the last five years, having contributed significantly to the creation and the development of SMS in various ways: organizing conferences and working seminars, giving lectures and teaching block courses, supervising graduate students and conducting cooperative research, from which GXUN also benefitted. Within a few years, several remarkable pieces of joint work were produced as results of SMS activities. Vladimir Gerdt taught the first two parts of a block course on quantum computation and quantum information at SMS in 2018, co-organized an International Seminar on Differential, Difference, and Algebraic Systems with Applications (SMS, January 29–31, 2018), and gave an invited talk at the International Seminar on Solving Equations (SMS, July 10–14, 2019). He attended the inauguration of SMS (held on May 18, 2017) as a distinguished guest. On that occasion, he was also appointed as Visiting Professor at GXUN.

I met Vladimir Gerdt many times on other occasions. Our frequent meeting places were Linz, Paris, and Beijing where I worked in different periods of time. It was always a great pleasure to meet and talk with him and listen to his warm-hearted teachings. Another memorable place where we met twice is RWTH Aachen, Germany. Vladimir had long-term collaborations with a strong group of researchers there, working jointly on Thomas decomposition of algebraic and differential systems since 2009.

The so-called Thomas decomposition is a classical approach of triangular decomposition developed by Joseph M. Thomas in his book “Differential Systems” of 1937. Thomas’ approach received little attention for more than half a century. In 1998, I refined Thomas’ concept of simple systems and proposed a simply structured method to decompose arbitrary polynomial systems into simple systems. My method mixes uses of algorithmic ideas underlying the elimination theories and methods of Joseph F. Ritt, Joseph M. Thomas, Abraham Seidenberg, and Wen-tsün Wu and utilizes the computation of subresultant regular subchains as the main elimination device. It has several advantages over other methods of triangular decomposition and drew attention from a number of researchers including Vladimir Gerdt, Stephane Dellière, and their co-workers at RWTH Aachen University, Germany and University of Limoges, France. In November 2009, I paid a visit to the Algebra and Number Theory group of RWTH Aachen under the invitation of Wilhelm Plesken, permanent host of Vladimir Gerdt at Aachen, and gave a seminar talk on triangular decomposition of differential polynomial systems. At that time, Vladimir and his co-workers Thomas Bächler, Markus Lange-Hegermann, and Daniel Robertz already started their study of Thomas decomposition and with them I had intensive discussions on algorithmic aspects and implementation issues of triangular decomposition for algebraic and differential systems during my visit. Over a decade, they investigated Thomas decomposition systematically and profoundly for both polynomial and differential polynomial systems, developed a new and practically efficient algorithm with implementations for triangular decomposition, and explored its application aspects broadly, making Thomas decomposition a powerful machinery for “solving” algebraic and differential systems. Along with their investigations, I remained in regular contact with Vladimir and other colleagues in Aachen and visited the group again during a conference in May 2012.

Wherever in Aachen or in Nanning, our joint effort was devoted to the development of science, education, and cooperation. We enjoyed the time we shared for our professional activities and value the friendship that was established over decades. With the sudden death of Vladimir, SMS lost a principal actor and the scientific community lost a great leader, unfortunately. He will forever be remembered for his cheerful personality and his outstanding contributions to the advancement of science and to our community.



Inauguration of SMS (center-left: Vladimir Gerdt;
center-right: Shangguo Xie, President of GXUN;
left: Dongming Wang; right: Jinzhao Wu)