



Lars Bertil Wahlbin

March 25, 1945 – July 13, 2013

The Finite Element Method (FEM), to which Lars Wahlbin, in the Department of Mathematics, devoted his professional career, is a powerful tool for approximating solutions to partial differential equations. It is used by engineers and scientists throughout the world to help solve problems of practical importance. But why does it work? How does it work? How can it be tweaked to work even better? These were the kinds of questions that interested Lars, and allowed him to use the subtle insights of mathematical analysis to make lasting and significant contributions to practical questions.

In essence, the FEM takes an infinite dimensional problem that is basically intractable and replaces it with a sequence of finite dimensional problems that can be solved by well-known methods implemented on a computer program. But how well do the solutions to the new easy problems approximate the solution to the original problem? To answer this question one needs error estimates, theoretical bounds on the size of the difference between the solutions of these two problems. These error estimates come in many different styles and flavors. Wahlbin is noted for two types in particular, called “maximum norm estimates” and “interior estimates.” Another striking feature of the FEM is a phenomenon called “superconvergence.” While the approximations converge to the true solution at a rather ho-hum rate throughout the whole space where the problem is posed, there are some special points in space where the rate of convergence is much snappier. Wahlbin made major contributions to understanding this phenomenon and how it can be used, and indeed he wrote the definitive book on the subject, “Superconvergence in the FEM.” He also wrote a second book, “Local error estimates in the FEM” that has been very influential in the field.

When he arrived at Cornell in 1974, Lars joined a group of three mathematicians, the others being Jim Bramble and Al Schatz, who specialized in the FEM, and they made Cornell’s

Mathematics Department one of the world's leading centers in the area. Lars supervised the Ph.D. theses of thirteen students. From 2003 to 2012, Lars was a co-organizer of the "Finite Element Circus," a regular twice yearly conference (at rotating northeast locations) on the theory and applications of the FEM. His graduate students fondly remember the wonderful camaraderie during car trips to the Circus with Lars and Al Schatz. As one of them reported, the discussion topics included the latest scientific developments in our area, "but we also heard about Lars' prowess as a handball goalie, his time serving in the Swedish military during the Cold War, and many other experiences that I might not have expected of an Ivy League Professor".

Lars was an editor for the prestigious journal "Mathematics of Computation" for many years, and served as its Managing Editor from 1996 to 2002, a kind of thankless task that "somebody has to do," and which Lars did with grace and skill and boundless energy. It is even reported that when some referee candidates failed to deliver timely reports on submitted papers, Lars would step in and do the refereeing work himself. This is consistent with his defining character trait that was observed by everyone who interacted with him: his selfless determination to give everyone the support they need to succeed. Another illustration of this was his service to the mathematics department as Director of Undergraduate Studies (July 1, 2007 – June 30, 2013), where he showed great patience and consideration helping students deal with their most pressing problems. But above all there was his wonderful sense of humor, and his contagious laughter.

Lars Wahlbin was born in Linköping, Sweden, one of a pair of identical twins, and educated at Chalmers University of Technology in Gotheborg where he received his Ph.D. under the direction of Vidar Thomee in 1971. He was a fellow at the University of Chicago 1972 – 1974 and then came to Cornell where he remained for the rest of his career. He is survived by his wife Anita, whom he married while still an undergraduate student; his son Stefan and daughter-in-law Kathy; and two grandchildren.

Robert S. Strichartz, Chair; John Guckenheimer, Timothy Healey, Al Schatz