Commun. Comput. Phys.
doi: 10.4208/cicp.010110.010310s

Vol. **9**, No. 3, pp. 481-496
March 2011

The Work of David Gottlieb: A Success Story

Bertil Gustafsson*

Division of Scientific Computing, Uppsala University, Box 337, SE-75105 Uppsala, Sweden.

Received 1 January 2010; Accepted (in revised version) 1 March 2010

Available online 17 September 2010

To the memory of David Gottlieb

Abstract. This article is a brief survey of David Gottlieb's extraordinary research career. It is impossible to give a thorough presentation of all his research and the impact of his work, but we shall describe the main contributions and give examples of the results in some of his papers. David was for many years the dominating person in the development of spectral methods, and we devote much of the space in this article to this field.

Contents

1 Introduction

This article is a brief survey of David Gottlieb's extraordinary research career. He published 125 papers and two books, and made an outstanding contribution to the field of numerical analysis. He had an unusual width in his work, and most types of numerical methods for PDE are included in his work. Fig. 1 shows an approximate distribution of his interest and production over the years.

*Corresponding author. *Email address:* bertil.gustafsson@it.uu.se (B. Gustafsson)

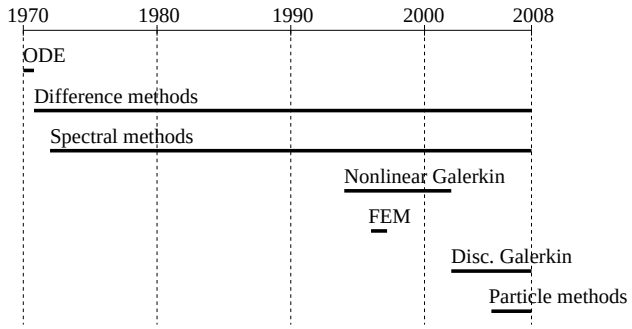

Figure 1: Distribution of David Gottlieb's research.

The first part containing some theoretical results about ordinary differential equations originates from his Master's work at Tel Aviv University.

It is impossible to give a thorough presentation of all his research and the impact of his work, but we shall describe the main contributions and give examples of the results in some of his papers. David was for many years the dominating person in the development of spectral methods, and we devote much of the space in this article to this field.

The list of publications at the end includes slightly more than a third of David's papers, and is limited to references made in the text. There are certainly many other significant papers, and many other coauthors who should be mentioned. But this would require a more complete biography.

2 Life in two countries

Born in Tel Aviv 1944, David Gottlieb spent his first 28 years in Israel. Like everyone else he had to make his military service, which lasted for three years. But not only that. He hade to fight a war in 1967, a kind of experience that is not shared by many mathematicians in the world.

Even if he was a talented mathematician, his main interest in early life was history. When he was wandering around the campus of Tel Aviv University to look for the history department, he encountered a mathematics professor who was inquiring about his errand. After a short conversation, David was invited to the mathematics department, and that was the start of his academic career in mathematics. The Masters degree under S. Breuer was followed by the PhD 1972 with Saul Abarbanel as the advisor.

Abarbanel had spent many years at MIT in Boston, and he arranged for David to visit the Department of Applied Mathematics there as a postdoc. His thesis was about construction of difference methods of split type for nonlinear partial differential equations, and it was therefore quite natural to work with one of the world's best specialists in that topic, Gilbert Strang. However, things took a different turn when he met Steve Orszag, who was interested in spectral methods for PDE. This came to be David's main research line.