Exponential Fitting

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by

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This book is dedicated to our
wives, children and
grandchildren.

Preface

Exponential fitting is a procedure for an efficient numerical approach of functions consisting of weighted sums of exponential, trigonometric or hyperbolic functions with slowly varying weight functions. Operations on such functions like numerical differentiation, quadrature, interpolation or solving ordinary differential equations whose solution is of this type are of a real interest nowadays in many phenomena as oscillations, vibrations, rotations or wave propagation. The behaviour of quantum particles is also described by this type of functions.

We witnessed the field for many years and contributed in it. Since the total number of papers accumulated so far in this field is over 200, and these papers are spread over journals with various profiles, to mention only those of applied mathematics, of computer science or of computational physics and chemistry, we thought that the time has come for a compact and systematic presentation of this vast material. It is hoped that in this way many persons who are faced with such problems in their own activity would be better helped than searching for the needed information in such an abundant literature.

This is what we do in this book which covers a series of aspects, ranging from the theory of the procedure up to direct applications and sometimes including ready-to-use programs.

The writing of this book was decided two years ago. Since our working places are not close to each other, we agreed to share the effort: the first author has taken upon him Chapters 1 to 5, while the second author was responsible for Chapter 6. However, we both share equal responsibility for the whole text.

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