

[Atteia, Marc](#)

Hilbertian kernels and spline functions. (English) Zbl 0767.41015

[Studies in Computational Mathematics](#). 4. Amsterdam: North-Holland. xii, 386 p. (1992).

From the introduction: This book is devoted to an extensive study of Hilbertian approximation with emphasis on spline functions theory. The origin of this book was an effort to show that spline theory parallels Hilbertian kernel theory, not only for splines derived from minimization of a quadratic functional, but more generally for splines considered as piecewise functions type.

This book would be a reference book and, as far as possible, self-contained.

Chapters I to V provide the theoretical background and chapters VI to VIII are devoted to fundamental applications. Some results in this book are new. Most of results are stated in real field but could not be extended easily to complex field.

Chapter I treats Hilbertian subspaces (resp. Hilbertian kernels) from the points of view of N. Aronszajn and L. Schwartz. We give an extensive presentation of operations on Hilbertian kernels (associated to operations on Hilbertian subspaces).

Chapter II provides basic ideas about linear approximation in Hilbert and Banach spaces and particularly about interpolation on an infinite mesh.

Chapter III is devoted to the fundamental properties of interpolatory and fitting spline functions with some classical examples. The link with Hilbertian kernels theory is done explicitly.

Chapter IV presents main operations on spline functions related to operations on Hilbertian kernels.

Chapter V is devoted to a precise study of the convergence of interpolatory spline functions.

Chapter VI provides an extensive study of spline functions defined on a convex set. The dual point of view is completely developed.

Chapter VII deals with simplicial splines the field of which has become rapidly growing for a decade. At the end of the book, one can find some comments on each chapter.

Reviewer: E.Deeba (Houston)

MSC:

- [41A15](#) Spline approximation
- [41A65](#) Abstract approximation theory (approximation in normed linear spaces and other abstract spaces)
- [41-01](#) Introductory exposition (textbooks, tutorial papers, etc.) pertaining to approximations and expansions

Cited in 1 Review Cited in 25 Documents
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Keywords:

[Hilbertian approximation](#); [applications](#); [Hilbertian kernels](#); [simplicial splines](#)