**Chui, Charles K.**

**Multivariate splines.** (English) Zbl 0687.41018

CBMS-NSF Regional Conference Series in Applied Mathematics 54. Philadelphia, PA: Society for Industrial and Applied Mathematics (SIAM) (ISBN 0-89871-226-2). vi, 189 p. (1988).

The book under review is a compilation of the material presented by the author at the Regional Conference on Theory and Applications of Multivariate Splines held at Howard University in Washington, D.C. in August 1987. The theory of piecewise-polynomial functions in several variables is presented following an elementary point of view that is similar to the theory and development of univariate spline analysis. The book has ten chapters. The first one is intended to study some of those topics of the theory of spline functions in one variable that have a corresponding version in the multivariate setting.

The other chapters are devoted to multivariate splines and some applications. The author introduces in the second chapter the notion of Box Splines and Multivariate Truncated Powers by using the same procedure as that of the first chapter. Recurrence formulas, the connection between box splines and truncated powers, order of approximation, are key words. Bivariate splines are studied in the third and fourth chapters. Special emphasis is made on dimensions, locally supported splines, basis, etc. The fourth chapter contains the more general setting of this functional spaces. The Bézier representation and smoothness conditions for adjacent simplices and mixed partitions are discussed in the chapter five.

Chapter six contains aspects on finite elements and vertex splines as well as some applications. Computational algorithms, quasi-interpolation schemes, multivariate interpolation and shape-preserving approximation by box splines series are the topics which the book presents in the other four chapters. Proofs and details are omitted although some comments are given. The bibliography contains 209 items.

Reviewer: J.Illán González

**MSC:**

41A15 Spline approximation
41A25 Rate of convergence, degree of approximation



**Keywords:**

piecewise-polynomial functions; Box Splines; Multivariate Truncated Powers; Recurrence formulas; Bézier representation; smoothness conditions; vertex splines; applications; Computational algorithms; quasi-interpolation schemes; multivariate interpolation; shape-preserving approximation