

analysts and approximation theorists, and of great interest to connoisseurs.

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39[65-06, 65D17].—HANS HAGEN (Editor), *Topics in Surface Modeling*, Geometric Design Publications, SIAM, Philadelphia, PA, 1992, x + 219 pp., 25½ cm. Price: Softcover \$45.50.

This is a collection of ten papers that evolved from a SIAM Conference on Geometric Design held at Tempe, Arizona between November 6 and 10, 1989. Some of the papers were presented there, and others were invited subsequently for this volume. The book is divided into three parts: I. Algebraic Methods, II. Variational Surface Design, and III. Special Applications.

In Part I (73 pages), all three papers concern surfaces in implicit form, $F(x, y, z) = 0$. Here we find mainly local methods that employ blending techniques to represent highly irregular surfaces. These may have holes, bumps, and other characteristics that preclude the use of anything global.

In Part II (13 pages), the first paper concerns estimating the twist vector of a surface. This estimator is then used advantageously in a patch scheme for surface representation. The second paper discusses an alternative to the Bezier patches, arrived at by direct variational methods.

In Part III (123 pages), there are five chapters. The first of these discusses at an abstract level the design problem of creating a surface that satisfies a number of nonlinear criteria (including aesthetic ones) by choosing values for a large number of parameters. The complexity of the computation and its resulting cost are troublesome aspects of this activity. The second paper addresses problems of conversion between different CAGD systems. The third again attacks the problems connected with the highly irregular surfaces that predominate in most manufacturing enterprises, such as the production of automobiles. In the latter industry, only a small proportion of parts conform to smooth free-flowing surfaces amenable to global representation. The fourth paper concerns contour representation problems that arise, for example, in medical imaging. The central question here is how to reconstruct a solid from a knowledge of some of its contours ("level sets"). Topological considerations (Morse theory) bear heavily on this topic. The final paper is devoted to problems of making C^1 - and C^2 -continuity connections between local surface patches.

The book should be useful to theoreticians and practitioners in Computer Aided Design.

E. W. C.

40[65-06, 65Y25].—HANS HAGEN (Editor), *Curve and Surface Design*, Geometric Design Publications, SIAM, Philadelphia, PA, 1992, x + 205 pp., 25½ cm. Price: Softcover \$44.50.

This is a collection of ten papers, some invited by the editor especially for this volume, and others arising from a SIAM conference on geometric design (Tempe, Arizona, November 1989). Among them are two papers on minimal-energy splines, three on weighted splines, one on geometric-continuous