

## TRIGONOMETRIC SPLINES WITH VARIABLE SHAPE PARAMETER

N. CHOUBEY AND A. OJHA

**ABSTRACT.** A new class of trigonometric splines has recently been introduced by Xuli Han [3, 4], where basis functions consist of a shape parameter that can be effectively used to control the shape of resulting trigonometric spline curves. A change in shape parameter, however, affects the curve globally, which may not be so suitable for CAGD applications. Keeping this in view, we have introduced a variable shape parameter in the trigonometric quadratic spline curves, in the present paper, which in its turn allows to manipulate the shape of the curve locally in each segment. We also study the approximation properties of these curves by determining the distance of the curve from the control points. For this, we employ a simpler approach, compared to the one used in [3]. We further study interpolation by these spline curves over a given knot sequence and corresponding data. A similar construction can also be presented for cubic trigonometric spline curves.

**1. Introduction.** Trigonometric B splines were first introduced in [10] and were subsequently studied from various perspectives, see e.g., [5, 6, 7, 9, 11, 12] and references therein. In recent years special attention has been paid to applications of trigonometric splines in geometric modeling, as it was observed that many problems of surface modeling could be better handled by trigonometric splines (especially those relating to data fitting on spherical objects). This has led to the introduction of various types of trigonometric splines having different features suitable for CAGD applications, see e.g., [8, 13, 14, 15]. Keeping in view the application potentialities of trigonometric splines, Han [3] has recently introduced a class of  $C^1$ -quadratic trigonometric spline curves with basis functions having a shape parameter. This parameter helps in better control over the shape of the resulting curve in

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