

1086-VG-2492 **Edmond J. Nadler*** (nadler@alum.mit.edu) and **Tae-wan Kim**. *Singularity of Cubic Bézier Curves and Surfaces*.

Parametric cubic polynomial curves and surfaces are useful in applications, being of relatively low dimension, and yet, flexible in their shape. To use these curves and surfaces fully, one must completely understand the cases of singularity. A parametric curve is singular where its derivative is zero, and a parametric surface, where its normal vector is zero.

These singularities are described here in terms of the Bézier form, a representation of parametric polynomial curves and surfaces employing the Bernstein polynomials as basis functions, in which the coefficients have geometric significance. Bézier curves and surfaces, which are used extensively in computer graphics, computer-aided design, and related fields, were first developed in the 1950s and 60s in the French automobile industry. (Received September 25, 2012)