



OPTIMAL-FEEDRATE INTERPOLATION FOR MACHINING PARAMETRIC CURVES

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ABSTRACT—In high-speed precision machining systems, trajectory requires very small feedrate fluctuation and contour error, which can be achieved with parametric interpolation. This paper proposes a speed-controlled interpolation method based on optimal-feedrate algorithm. The real-time interpolation method was taken full its advantages, the chord error and the difference between the orientation of tangent vector of the curve at current point and previous point were repeatedly checked through the whole interpolation process. If either chord error exceeded the prescribed tolerance or sharp corner was detected, the feedrate in the proposed interpolation method was automatically adjusted in order to confine the chord error within the prescribed tolerance. A parametric curve, determined by the non-uniform rational B-spline (NURBS), was employed to test the feasibility and precision of the proposed interpolation method.

Key Words: Parametric interpolation; NURBS; Speed-controlled interpolation; high-speed precision machining systems.