Precise Continuous Contact Motion Analysis for Freeform Geometry

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Abstract
This work presents an efficient algorithm for generating a continuous and precise contact motion between geometric models bounded by piecewise polynomial $C^1$-continuous parametric B-spline curves and surfaces. The contact configurations are characterized algebraically. We will start by discussing simpler cases of curves' contact in the plane, only to continue and considered a CNC tool (cylinder)-freeform surface contact in multi-axis machining context. Hyper osculating circles are considered along with double tangency contacts, in the case of tool-surface analysis. We strive to ensure the topology of the reconstructed solution and we demonstrate the effectiveness of the proposed approach using several examples of both 2D curve-curve contacts and robotics path navigations and 3D tool-surface contacts in 5-axis machining scenarios.

* In collaboration with Yongjoon Kim, Technion, Myung Soo Kim, SNU, Michael Baron, Kaust, Helmut Pottmann, Vienna Univ. of Tech.

Biography
Gershon Elber is a professor in the Computer Science Department, Technion, Israel. His research interests span computer aided geometric designs and computer graphics. Prof. Elber received a BSc in computer engineering and an MSc in computer science from the Technion, Israel in 1986 and 1987, respectively, and a PhD in computer science from the University of Utah, USA, in 1992. He is a member of the ACM. Prof. Elber has served on the editorial board of the Computer Aided Design, Computer Graphics Forum, The Visual Computer, Graphical Models, and the International Journal of Computational Geometry & Applications and has served in many conference program committees including Solid Modeling, Shape Modeling, Geometric Modeling and Processing, Pacific Graphics, Computer Graphics International, and Siggraph. Prof. Elber was one of the paper chairs of Solid Modeling 2003 and Solid Modeling 2004, and one of the conference chairs of Solid and Physical Modeling 2010. He has published over 150 papers in international conferences and journals and is one of the authors of a book titled "Geometric Modeling with Splines - An Introduction".

***** ALL ARE WELCOME *****