

数学与系统科学研究院
计算数学所定期学术报告

报告人: Associate Prof. Yongjie (Jessica) Zhang

(Mechanical Engineering, Courtesy Appointment in Biomedical Engineering, Carnegie Mellon University)

报告题目:

**Volumetric T-spline Construction
Using Boolean Operations**

邀请人: 徐国良 研究员

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(15: 30~16: 00 茶歇)

报告地点: 科技综合楼三层 311

计算数学所报告厅

Abstract:

In this talk, I will present a novel algorithm for constructing a volumetric T-spline from B-reps inspired by Constructive Solid Geometry (CSG) Boolean operations. By solving a harmonic field with proper boundary conditions, the input surface is automatically decomposed into regions that are classified into two groups represented, topologically, by either a cube or a torus. We perform two Boolean operations (union and difference) with the primitives and convert them into polycubes through parametric mapping. With these polycubes, octree subdivision is carried out to obtain a volumetric T-mesh, and sharp features detected from the input model are also preserved. An optimization is then performed to improve the quality of the volumetric T-spline. Finally we extract trivariate B_ezier elements from the volumetric T-spline, and use them directly in isogeometric analysis.

Short Bio:

Yongjie (Jessica) Zhang is an Associate Professor in Mechanical Engineering at Carnegie Mellon University with a courtesy appointment in Biomedical Engineering. She received her B.Eng. in Automotive Engineering, and M.Eng. in Engineering Mechanics, all from Tsinghua University, China, and M.Eng. in Aerospace Engineering and Engineering Mechanics, and Ph.D. in Computational Engineering and Sciences from the University of Texas at Austin. Her research interests include computational geometry, mesh generation, computer graphics, visualization, finite element method, isogeometric analysis and their application in computational biomedicine and engineering. She has co-authored over 90 publications in peer-reviewed international journals and conference proceedings. She is the recipient of NSF CAREER Award, Office of Naval Research Young Investigator Award, George Tallman Ladd Research Award, and Struminger Junior Faculty Fellowship.

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