Jieyin Yang

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EDUCATION

University of Chinese Academy of Sciences *Aug. 2021 – present*
Ph.D. in Applied Mathematics
Advisor: Prof. Xiaohong Jia
GPA: 3.91/4.0

Columbia University *Jan. 2020 – Jun. 2020*
Visiting Student in Engineering and Applied Sciences

University of Chinese Academy of Sciences *Aug. 2017 – Jun. 2021*
B.S. in Mathematics and Applied Mathematics
GPA: 3.95/4.0, Rank: 2/52

RESEARCH INTERESTS

Computer Graphics, Computer Aided Design, Computational Algebraic Geometry

PUBLICATIONS

Overlap Region Extraction of Two NURBS Surfaces.
Jieyin Yang, Xiaohong Jia
ACM Transactions on Graphics (Proc. SIGGRAPH Asia 2025)

Boolean Operation for CAD Models Using a Hybrid Representation.
Yingyu Yang, Xiaohong Jia, **Jieyin Yang**, Shiqing Xin, Dong-Ming Yan
ACM Transactions on Graphics (Proc. SIGGRAPH 2025)

Computing the intersection of two ellipsoids based on a fast algebraic topology determination strategy.
Xiao Chu, Kai Li, Xiaohong Jia, **Jieyin Yang**, Jiarui Kang
Computer Aided Geometric Design (Proc. GMP 2025)

Accurate and robust registration of low overlapping point clouds.
Jieyin Yang, Mingyang Zhao, Yingrui Wu, Xiaohong Jia
Computer & Graphics, 2024

Topology Guaranteed B-Spline Surface-Surface Intersection.
Jieyin Yang, Xiaohong Jia, Dong-Ming Yan
ACM Transactions on Graphics (Proc. SIGGRAPH Asia 2023)

RESEARCH PROJECTS

NURBS Surface Intersection Calculation *2024 – ongoing*

- The intersection curves of NURBS surfaces can exhibit highly complex topologies, including multiple branches, singularities, small loops, tangency, and partial overlaps. Efficient computation of these complex topologies is critical for improving the computational performance and reliability of CAD systems.
- We proposed an efficient algorithm for detecting and computing small loops and tangent intersection curves using the winding number theorem, enhancing the accuracy and efficiency of surface intersection calculations.
- Existing surface intersection algorithms may fail or produce errors in cases of surface overlap. We proposed a bi-level optimization framework with a tolerance-based approach and an efficient algorithm for detecting and computing the overlap region, enhancing the stability of Boolean operations in CAD systems.
- Paper "Boolean Operation for CAD Models Using a Hybrid Representation" is accepted by the journal track to SIGGRAPH 2025.
- Paper "Overlap Region Extraction of Two NURBS Surfaces" is accepted by the journal track to SIGGRAPH Asia 2025.
- Paper "A Robust and Efficient Intersection Algorithm for NURBS Surfaces: Handling Small Loops and Tangent Intersections" is under revision of ACM Transactions on Graphics.

Freeform Surface Intersection Theory and Methods *2021 – 2024*

- Surface/Surface intersection is a fundamental task in Computer-Aided Design (CAD) and geometric modeling systems. The primary challenge for CAD system reliability lies in the lack of topologically stable surface intersection algorithms.
- We proposed a parametric surface intersection algorithm that guarantees the topology of the intersection curve. The method employs fast implicitization and topological computation to ensure the correctness of the intersection topology.
- Paper "Topology Guaranteed B-Spline Surface-Surface Intersection" is accepted by the journal track to SIGGRAPH Asia 2023.

Honors and Awards

2025	**CSIAM Applied Mathematics Achievement Award**: Surface Intersection Method and Software for Geometry Engine
2024	**Doctoral National Scholarship**
2023	**Hua Luogeng Scholarship of AMSS**
2021-25	**Merit Student of CAS**
2020	**Undergraduate National Scholarship**

Skills

Programming	C++, Matlab, Maple
Math	Computational geometry, Symbolic computation, Linear algebra, Numerical optimization