
Contents

Session 1: Mesh Morphing and Moving Mesh

High Quality Mesh Morphing Using Triharmonic Radial Basis Functions	1
<i>Daniel Sieger, Stefan Menzel, Mario Botsch</i>	
Efficient Moving Mesh Technique Using Generalized Swapping	17
<i>Frédéric Alauzet</i>	
An <i>h-r</i> Moving Mesh Method for One-Dimensional Time-Dependent PDEs	39
<i>Benjamin Ong, Robert Russell, Steven Ruuth</i>	

Session 2: Mesh Quality and Mesh Improvement

Mesh Improvement Methodology for 3D Volumes with Non-planar Surfaces	55
<i>Alan Kelly, Lukasz Kaczmarczyk, Chris Pearce</i>	
Robust Untangling of Curvilinear Meshes	71
<i>Jean-François Remacle, Thomas Toulorge, Jonathan Lambrechts</i>	
Defining Quality Measures for Mesh Optimization on Parameterized CAD Surfaces	85
<i>Abel Gargallo-Peiró, Xevi Roca, Jaine Peraire, Josep Sarrate</i>	

Session 3: Hex and Quad Meshing I

Automated Structured All-Quadrilateral and Hexahedral Meshing of Tubular Surfaces	103
<i>Guanglei Xiong, Suraj Musuvathy, Tong Fang</i>	
A Study on Size-Optimal Longest Edge Refinement Algorithms	121
<i>Carlos Bedregal, María-Cecilia Rivara</i>	

**A PDE Based Approach to Multidomain Partitioning and
Quadrilateral Meshing** 137
Nicolas Kowalski, Franck Ledoux, Pascal Frey

**A Robust 2-Refinement Algorithm in Octree and Rhombic
Dodecahedral Tree Based All-Hexahedral Mesh Generation** 155
Yongjie Zhang, Xinghua Liang, Guoliang Xu

Session 4A: Tri and Tet Meshing

**Incrementally Constructing and Updating Constrained Delaunay
Tetrahedralizations with Finite Precision Coordinates** 173
Hang Si, Jonathan Richard Shewchuk

**Lattice Cleaving: Conforming Tetrahedral Meshes of Multimaterial
Domains with Bounded Quality** 191
Jonathan R. Bronson, Joshua A. Levine, Ross T. Whitaker

SVM-Based Topological Optimization of Tetrahedral Meshes 211
Xiaoshen Chen, Dewen Peng, Shuming Gao

Singularities in Parametric Meshing 225
Romain Aubry, Kaan Karamete, Eric Mestreau, Saikat Dey

**Automatic 3D Mesh Generation of Multiple Domains for Topology
Optimization Methods** 243
Jean-Christophe Cuillière, Vincent Francois, Jean-Marc Drouet

Session 4B: Hex and Quad Meshing II

**Diamond-Kite Meshes: Adaptive Quadrilateral Meshing and
Orthogonal Circle Packing** 261
David Eppstein

Quadrilateral Mesh Generation Using Hierarchical Templates 279
Antonio Carlos de Oliveira Miranda, Luiz Fernando Martha

**Geometric Reasoning in Sketch-Based Volumetric Decomposition
Framework for Hexahedral Meshing** 297
*Jean Hsiang-Chun Lu, Inho Song, William Roshan Quadros,
Kenji Shimada*

**A Constraint-Based System to Ensure the Preservation of Sharp
Geometric Features in Hexahedral Meshes** 315
*Franck Ledoux, Nicolas Le Goff, Steve J. Owen, Matthew L. Staten,
Jean-Christophe Weill*

Automatic Hexahedral Sweep Mesh Generation of Open Volumes 333
Nilanjan Mukherjee, Bhanu Peddi, Jean Cabello, Michael Hancock

Session 5A: Surface Meshing

Variational Anisotropic Surface Meshing with Voronoi Parallel Linear Enumeration	349
<i>Bruno Lévy, Nicolas Bonneel</i>	
Anisotropic Rectangular Metric for Polygonal Surface Remeshing	367
<i>Bertrand Pellenard, Jean-Marie Morvan, Pierre Alliez</i>	
Surface Mesh Optimization, Adaption, and Untangling with High-Order Accuracy	385
<i>Bryan Clark, Navamita Ray, Xiangmin Jiao</i>	
Surface Segmentation for Improved Remeshing	403
<i>John Edwards, Wenping Wang, Chandrajit Bajaj</i>	

Session 5B: Parallel Meshing and GPU Algorithms

Parallel Curved Mesh Adaptation for Large Scale High-Order Finite Element Simulations	419
<i>Qiukai Lu, Mark S. Shephard, Saurabh Tendulkar, Mark W. Beall</i>	
Parallel Adaptive Boundary Layer Meshing for CFD Analysis	437
<i>Aleksandr Ovcharenko, Kedar Chitale, Onkar Sahni, Kenneth E. Jansen, Mark S. Shephard</i>	
A 2nd Generation Parallel Advancing Front Grid Generator	457
<i>Rainald Löhner</i>	
CPU-GPU Algorithms for Triangular Surface Mesh Simplification	475
<i>Suzanne M. Shontz, Dragos M. Nistor</i>	

Session 7A: Boundary Layer and Polytopal Meshes

Robust Boundary Layer Mesh Generation	493
<i>Adrien Loseille, Rainald Löhner</i>	
Improving Element-Boundary Alignment in All-Hex Meshes of Thin-Walled Solids by Side-Face Identification	513
<i>Soji Yamakawa, Kenji Shimada</i>	
OpenVolumeMesh – A Versatile Index-Based Data Structure for 3D Polytopal Complexes	531
<i>Michael Kremer, David Bommes, Leif Kobbelt</i>	

Session 7B: Applications

Automated Hex Meshing for Turbomachinery Secondary Air System ...	549
<i>Feng Wang, Luca di Mare</i>	

Edge-Based Anisotropic Mesh Adaptation for CFD Applications 567
Thierry Coupez, Ghina Jannoun, Jeremy Veyssset, Elie Hachem

**Impacts of Boundary Conforming Meshes on Electrical Cardiac
Simulation** 585
*Darrell J. Swenson, Joshua A. Levine, Jess D. Tate, Ross T. Whitaker,
Rob S. MacLeod*

Author Index 603