



# Conference on Geometry
# Theorie and Application

**Vorau, June 3 - 8, 2007**

# Programme

| Monday, June 4, 2007 | | | |
|---|---|---|---|
| **10:15-10:30** | | **Opening Ceremony** | |
| **Chair:** | **Röschel** Otto | | |
| 10:30-10:50 | **Vörös** László | University of Pécs | Two- and Three-dimensional Tiling on the Base of Higher-dimensional Cube Mosaics |
| 10:55 -11:15 | **Blunck** Andrea | University of Hamburg | Clifford Parallelisms (joint work with Stefano PASOTTI and Silvia PIANTA) |
| 11:20 -11:40 | **Ostroški** Mirela | University of Zagreb | Technology Enhanced Learning of Mathematics (joint work with Blaženka DIVJAK) |
| 11:45-12:05 | **Szirmai** Jenö | Budapest University of Technology and Economics | On Ball Coverings in Nil Space |
| **LUNCH** | | | |
| **Chair:** | **Divjak** Blaženka | | |
| 14:30-14:50 | **Horváth** Ákos G. | Budapest University of Technology and Economics | Topological Properties of the Shadow Boundary of a Centrally Symmetric Convex Body |
| 14:55-15:15 | **Martini** Horst | Chemitz University of Technology | On Jung's Theorem in Minkowski Spaces |
| 15:20-15:40 | **Talata** István | Szent István University Budapest | An Algorithm for Determining the Maximal Triangle of Given Shape Contained in a Convex Polytope |
| 15:45 -16:15 | | **COFFEE BREAK** | |
| **Chair:** | **Žagar** Emil | | |
| 16:15-17:00 | **Šír** Zbyněk | Charles University Praha | Pythagorean Hodograph Curves for Fast Manufacturing |
| 17:05-17:15 | | **SHORT BREAK** | |
| 17:15-17:35 | **Béla** Szilvia | Budapest University of Technology and Economics | About the Geometry of Milling Paths |
| 17:40-18:00 | **Lávička** Miroslav | University of West Bohemia, Plzeň | RC Properties of PN Parametrizations |
| | | | |
| **Chair:** | **Temesvári** Ágota | | |
| 20:00-20:45 | **Bär** Gert | TU Dresden | Abstrakte Kunst und Mathematik |

| Tuesday, June 5, 2007 | | | |
|---|---|---|---|
| **Chair:** | **Stachel** Hellmuth | | |
| 08:30-09:15 | **Sauer** Tomas | Justus Liebig Universität Gießen | Geometric Quantities in Ophthalmology |
| 09:20-09:30 | | **SHORT BREAK** | |
| 09:30-09:50 | **Della Vecchia** Giovanni | Johannes Kepler University Linz | A Construction of Manifold Spline Surfaces |
| 09:55-10:15 | **Bastl** Bohumír | University of West Bohemia, Plzeň | Computing Exact Offset Surfaces of Quadratic Triangular Bézier Patches |
| 10:20-10:50 | | **COFFEE BREAK** | |
| **Chair:** | **Lávička** Miroslav | | |
| 10:50 -11:10 | **Tomiczková** Světlana | University of West Bohemia, Plzeň | Area and Volume of the Minkowski Sum |
| 11:15 -11:35 | **Výrut** Radek | University of West Bohemia, Plzeň | Minkowski Sum and its Computation |
| 11:40 -12:00 | **Nava Yazdani** Esfandiar | Graz University of Technology | Smothness Properties of Lie Group Subdivision Schemes |
| **LUNCH** | | | |
| **Chair:** | **Sauer** Tomas | | |
| 14:30 -14:50 | **Kosinka** Jiří | Johannes Kepler University Linz | MOS Surfaces: A 2D Analogy to MPH Curves |
| 14:55 -15:15 | **Oberneder** Margot | Johannes Kepler University Linz | A Geometric Iteration Method for Solving Nonlinear Equations |
| 15:20 -15:30 | | **SHORT BREAK** | |
| 15:30-15:50 | **Brakhage** Karl-Heinz | RWTH Aachen | Spline Techniques for Generating Airplane Wings with Practical Applications |
| 15:55 -16:15 | **Moore** Brian | Johann Radon Institute for Computational and Applied Mathematics (RICAM), Linz | Computing Intersections of Planar Algebraic Curves Using Bivariate Quadratic Clipping |
| 16:15 -16:45 | | **COFFEE BREAK** | |
| **Chair:** | **Gorjanc** Sonja | | |
| 16:45 -17:05 | **Molnár** Emil | Budapest University of Technology and Economics | Visibility of the Higher-dimensional Central Projection onto the Projective Sphere (joint work with János KATONA) |
| 17:10-17:30 | **Spirova** Margarita | University of Sofia | Amusing Properties of Circles in Strictly Convex Minkowski Planes |
| 17:35-17:55 | **Stachel** Hellmuth | Vienna University of Technology | From Rytz to the Covariance Ellipsoid |
| | | | |
| 19:30 | | **Conference Dinner** | |

| Wednesday, June 6, 2007 | | | |
|---|---|---|---|
| **Chair:** | **Blunck** Andrea | | |
| 08:30-09:15 | **Tarnai** Tibor | Budapest University of Technology and Economics | Mathematics of Baskets |
| 09:20-09:30 | | **SHORT BREAK** | |
| 09:30-09:50 | **Caravantes** Jorge | University of Cantabria | Computation of the Topology of Arrangements of Curves of Low Degree |
| 09:55-10:15 | **Havlicek** Hans | Vienna University of Technology | From Geometry to Invertibility Preservers (joint work with Peter ŠEMRL |
| 10:20-10:50 | | **COFFEE BREAK** | |
| **Chair:** | **Martini** Horst | | |
| 10:50 -11:10 | **Divjak** Blaženka | University of Zagreb | The General Solutions of Frenet Systems of Equations (joint work with Damir HORVAT and Zlatko ERJAVEC) |
| 11:15-11:35 | **Gorjanc** Sonja | University of Zagreb | *n* th Degree Inversion and Some of its Products (joint work with Vladimir BENIĆ) |
| 11:40-12:00 | **Temesvári** Ágota | University of West Hungary, Sopron | Proofs of Elementar Theorems Using Models of Hyperbolic Geometry (joint work with Jenö HORVÁTH) |
| **LUNCH** | | | |
| Afternoon | | **EXCURSION** | |

| Thursday, June 7, 2007 | | | |
|---|---|---|---|
| **Chair:** | **Tarnai** Tibor | | |
| 08:30-08:50 | **Zsombor-Murray** Paul | McGill University, Montréal | Singularity of Redundant 4R Translational Manipulators |
| 08:55-09:15 | **Karger** Adolf | Charles University Praha | Self-Motions of Steward-Gough Type Platforms |
| 09:20-09:30 | | **SHORT BREAK** | |
| 09:30-09:50 | **Gfrerrer** Anton | Graz University of Technology | Some Geometric and Kinematic Aspects of Wheeled Mobile Robots |
| 09:55-10:15 | **Hašek** Roman | University of South Bohemia,České Budějovice | Classification of Singular Robot-Manipulators |
| 10:20-10:50 | | **COFFEE BREAK** | |
| **Chair:** | **Schröcker** Hans-Peter | | |
| 10:50 -11:10 | **Erjavec** Zlatko | University of Zagreb | The Equiform Differential Equation of Curves in Pseudo-Galilean Space (joint work with Blaženka DIVJAK) |
| 11:15 -11:35 | **Lubaś** Ewa | Pedagogical Academia Krakow | Some Geometry Construction Problems and Solving by Applying Projective Geometry Theorems |
| 11:40 -12:00 | **Manhart** Friedrich | Vienna University of Technology | Affine Geometry of Maximal Surfaces in Minkowski 3-Space |
| **LUNCH** | | | |
| **Chair:** | **Zsombor-Murray** Paul | | |
| 14:30-14:50 | **Helmberg** Gilbert | University of Innsbruck | A Space-Filling Fractal Curve |
| 14:55 -15:15 | **Šimić** Marija | University of Zagreb | Curvature of the Focal Conic in Isotropic Plane (joint work with Jelena BEBAN-BRKIĆ) |
| 15:20-15:40 | **Milin Šipuš** Željka | University of Zagreb | Transformation of Surfaces in the Pseudo-Galilean Space (joint work with Blaženka DIVJAK) |
| 15:45 -16:15 | | **COFFEE BREAK** | |
| **Chair:** | **Molnár** Emil | | |
| 16:15-17:00 | **Schröcker** Hans-Peter | University of Innsbruck | Uniqueness Results for Minimal Enclosing Quadrics |
| 17:05 -17:15 | | **SHORT BREAK** | |
| 17:15 -17:35 | **Yang** Huaiping | Johannes Kepler University Linz | 3D Shape Reconstruction and Modeling with T-Spline Level Sets |
| 17:40-18:00 | **Kudličková** Soňa | Comenius University Bratislava | Hermite Splines with Desired Shape |

| Friday, June 8, 2007 | | | |
|---|---|---|---|
| **Chair:** | **Šír** Zbyněk | | |
| 08:30-09:15 | **Žagar** Emil | University of Ljubljana | On the Deviation of a Parametric Polynomial Interpolant from its Data Polygon |
| 09:20-09:30 | | **SHORT BREAK** | |
| 09:30-09:50 | **Palaj** Vladimir | Comenius University Bratislava | Algorithms for Curves Intersection |
| 09:55-10:15 | **Feichtinger** Robert | Johannes Kepler University Linz | Range Constraints for T-Spline Level-set Evolution |
| 10:20-10:50 | | **COFFEE BREAK** | |
| **Chair:** | **Jüttler** Bert | | |
| 10:50-11:10 | **Jurkin** Ema | University of Zagreb | Entirely Circular Curves of Order Four in the Hyperbolic Plane Produced by Projective Mapping between two Pencils of Conics |
| 11:15-11:35 | **Lebmeir** Peter | TU München | Invariants of Plain Algebraic Curves (joint work with Jürgen RICHTER-GEBERT) |
| **11:40** | | **Closing Ceremony** | |
| **LUNCH** | | | |

JOHANNES KEPLER UNIVERSITÄT LINZ
Netzwerk für Forschung, Lehre und Praxis

TU Graz
Graz University of Technology

# Conference on Geometry
# Theorie and Application

**Vorau, June 3 - 8, 2007**

## List of Participants

| | | |
|---|---|---|
| **Bär** | Gert | TU Dresden |
| **Bastl** | Bohumír | University of West Bohemia, Plzeň |
| **Beban-Brkić** | Jelena | University of Zagreb |
| **Béla** | Szilvia | Budapest University of Technology and Ecocnomics |
| **Blunck** | Andrea | University of Hamburg |
| **Brakhage** | Karl-Heinz | RWTH Aachen |
| **Caravantes** | Jorge | University of Cantabria |
| **Della Vecchia** | Giovanni | Johannes Kepler University Linz |
| **Divjak** | Blaženka | University of Zagreb |
| **Erjavec** | Zlatko | University of Zagreb |
| **Feichtinger** | Robert | Johannes Kepler University Linz |
| **Gfrerrer** | Anton | Graz University of Technology |
| **Gorjanc** | Sonja | University of Zagreb |
| **Hamann** | Marco | TU Dresden |
| **Hašek** | Roman | Uni South Bohemia, Ceske Budejovice |
| **Havlicek** | Hans | Vienna University of Technology |
| **Helmberg** | Gilbert | University of Innsbruck |
| **Horvat** | Damir | University of Zagreb |
| **Horvath** | Jenö | University of West Hungary, Sopron |
| **Horváth** | Ákos G. | Budapest University of Technology and Ecocnomics |
| **Jakuš** | Marija | University of Zagreb |
| **Jurkin** | Ema | University of Zagreb |
| **Jüttler** | Bert | Johannes Kepler University Linz |
| **Karger** | Adolf | Charles University Praha |
| **Katona** | János | Szent István University Budapest |
| **Kosinka** | Jiří | Johannes Kepler University Linz |
| **Kudličková** | Soňa | Comenius University Bratislava |
| **Lang** | Johann | Graz University of Technology |
| **Lávička** | Miroslav | University of West Bohemia, Plzeň |
| **Lebmeir** | Peter | TU München |
| **Lubaś** | Ewa | Pedagogical Academia Krakow |
| **Manhart** | Friedrich | Vienna University of Technology |
| **Martini** | Horst | Chemitz University of Technology |
| **Mick** | Sybille | Graz University of Technology |
| **Milin Šipuš** | Željka | University of Zagreb |
| **Molnár** | Emil | Budapest University of Technology and Ecocnomics |
| **Moore** | Brian | Johann Radon Institute, Linz |
| **Müller** | Christian | Graz University of Technology |
| **Nava Yazdani** | Esfandiar | Graz University of Technology |
| **Oberneder** | Margot | Johannes Kepler University Linz |

| | | |
|---|---|---|
| **Ostroški** | Mirela | University of Zagreb |
| **Palaj** | Vladimir | Comenius University Bratislava |
| **Röschel** | Otto | Graz University of Technology |
| **Sauer** | Tomas | Justus-Liebeig-Universität Gießen |
| **Schröcker** | Hans-Peter | University of Innsbruck |
| **Šimić** | Marija | University of Zagreb |
| **Šír** | Zygbněk | Charles University Praha |
| **Spirova** | Margarita | University of Sofia |
| **Stachel** | Hellmuth | Vienna University of Technology |
| **Szirmai** | Jenö | Budapest University of Technology and Ecocnomics |
| **Talata** | Istvan | Szent István University Budapest |
| **Tarnai** | Tibor | Budapest University of Technology and Ecocnomics |
| **Temesvári H.** | Ágota | University of West Hungary, Sopron |
| **Tomiczková** | Světlana | University of West Bohemia, Plzeň |
| **Vörös** | László | Univ. Pécs, Technical Fac, (Arch) |
| **Výrut** | Radek | University of West Bohemia, Plzeň |
| **Wallner** | Johannes | Graz University of Technology |
| **Wresnik** | Helmut | Graz University of Technology |
| **Yang** | Huaiping | Johannes Kepler University Linz |
| **Žagar** | Emil | University of Ljubljana |
| **Zsombor-Murray** | Paul | McGill University, Montréal |

# ABSTRACT

## Stift Vorau, June 3 – June 8, 2007


Name: **Vladimir Palaj**

Affiliation: **Faculty of Mathematics, Physics and Informatics**
**Comenius University**

Postal address: **Mlynska dolina**
**842 48 Bratislava, Slovakia**

E-Mail: **palaj@fmph.uniba.sk**


Title of the presentation: **Algorithms for Curves Intersection**


ABSTARCT:

Curve/curve intersection belongs to the fundamental problems of computational geometry. To find a set of points of the curve/curve intersection could be performed by several algorithmic techniques. At the present time there exist several different approaches to this problem but the endeavor is to avoid difficulties in calculation which are mainly results of polynomial representation higher degree curves. We stay indeed at the original polynomial approach, e.g. Bezier clipping method, established by Nishita et al. in 1990. Presented paper describes the mathematical background of this method that solves existing problem of two curves intersection on class plane Bezier curves only.

# Call for Papers: Classical Techniques for Applied Geometry

**A Special Issue of Computer Aided Geometric Design**
**Guest Editors: Bert Jüttler, Otto Röschel, Emil Žagar**
**Submission Deadline: November 1st, 2007**

**Background.** Techniques from classical geometry have been a rich source of inspiration for basic research in Computer Aided Geometric Design. The wealth of knowledge, which is available in classical, differential, algebraic and descriptive geometry, provides many useful results for geometric applications, ranging from Geometric Modeling up to Medicine.

**Scope.** This special issue is devoted to new results originating from the interaction of computational methods, such as spline and approximation techniques, with classical results in applied geometry. In particular, it will contain relevant papers which were presented at the

Conference on Geometry: Theory and Applications (Vorau, Austria, 2007).

Additional submissions are also welcome.

**Topics.** Main topics include, but are not limited to:

- Applications of real algebraic geometry and symbolic computation
- Concepts of classical differential geometry in geometric modeling
- Spline theory and its applications
- Kinematical Geometry and Robotics

**Submission.** Please use the electronic submission system at

`http://ees.elsevier.com/cagd`

**Contact**


- Bert Jüttler, Johannes Kepler University, Linz, Austria,
  `http://www.ag.jku.at, bert.juettler@jku.at`
- Otto Röschel, Graz University of Technology, Austria,
  `http://www.geometrie.tugraz.at, roeschel@tugraz.at`
- Emil Žagar, University of Ljubljana, Slovenia,
  `http://valjhun.fmf.uni-lj.si/~emil/, emil.zagar@fmf.uni-lj.si`