Colloquium

Isotropic Geometry: New Results with Applications in Geometric Computing

Helmut Pottmann
TU Wien

Host: Matthew Kwan and Robert Seiringer

Abstract: The geometry of simply isotropic 3-space is one of the classical Cayley-Klein geometries. Despite its degenerate metric, it possesses numerous results that are very similar to their Euclidean counterparts. Isotropic geometry appears naturally in mechanics and structural design via the Airy stress surface and leads to new insights on material-minimizing forms and structures, smoothness concepts for polyhedral surfaces and the design of triangle meshes with controlled roughness. Moreover, isotropic geometry turns out to be useful for the computational solution of difficult Euclidean problems. One first solves the isotropic counterpart and then uses it to initialize an optimization algorithm for the numerical computation of Euclidean solutions. This is demonstrated at hand of several examples, most notably for the design of flexible quad meshes with planar faces (Q-nets). Based on an appropriate novel definition of isometric maps between surfaces in isotropic 3-space one can completely characterize flexible Q-nets in isotropic 3- space. Surprisingly, hardly visible shape changes lead to Euclidean flexible Q-nets.

Wednesday, March 5, 2025 03:30pm - 04:30pm
Raiffeisen Lecture Hall, Central Building

This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station. Please find a schedule of the ISTA Shuttle on our webpage: https://ista.ac.at/en/campus/how-to-get-here/ The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.

www.ista.ac.at | Institute of Science and Technology Austria | Am Campus 1 | 3400 Klosterneuburg