Du, Qiang; **Gunzburger, Max D.**; **Ju, Lili**
Constrained centroidal Voronoi tessellations for surfaces. (English) Zbl 1036.65101
SIAM J. Sci. Comput. 24, No. 5, 1488-1506 (2003).

The objective of the paper is to study the centroidal Voronoi tessellations (CVT) methododlogy developed *Q. Du, V. Faber* and *M. Gunzburger* [SIAM Rev. 41, 637–676 (1999; Zbl 0983.65021)], in the case where the point sets are constrained to lie on surfaces in $\mathbb{R}^N$. The authors develop and analyse the notion of constrained CVTs (CCVTs). Some deterministic and probabilistic algorithms for the construction of CCVTs are discussed.

The high quality of CCVT point sets is demonstrated by some computational examples. The use of CCVT point sets for polynomial interpolation and numerical integration on a sphere are also discussed. It is observed that the CCVT point distributions are very uniform and would be useful for piecewise polynomial interpolation on the sphere and for finite element discretizations of partial differential equations posed on a sphere.

Reviewer: H. P. Dikshit (New Delhi)

MSC:

65N50	Mesh generation, refinement, and adaptive methods for boundary value problems involving PDEs
65D05	Numerical interpolation
65D32	Numerical quadrature and cubature formulas
65N30	Finite element, Rayleigh-Ritz and Galerkin methods for boundary value problems involving PDEs
58F05	Hamiltonian and Lagrangian systems; symplectic geometry [See also 70Hxx, 81S10] (MSC2000)

Keywords:

surface tessellations; optimal Voronoi tessellations; surface interpolation; surface quadrature; point sets on surfaces; numerical examples; algorithms

Software:

STRIPACK

Full Text: DOI