The application of Delaunay triangulation for numerical solution of magnetic field

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The popular method for numerical solution of some problems of mathematical physics is the finite elements method. This method needs a mesh of triangles. The convergence rate of iteration process of numerical solution of the problem by the finite elements method depends on geometrical configuration of the mesh.

We prove the following extremal property: Let M be a triangular mesh with set of knots K. Denote by $S(M)$ the sum of cotangents of interior angles of all triangles from M.

Theorem 1. *For any fixed set of knots K, the sum $S(M)$ as a function on mesh M reaches his minimum for Delaunay triangulation.*

Using this extremal property, the theorem is obtained, that for any fixed knots set, for numerical solution of Maxwell equation of magnetic field the optimal mesh is Delaunay triangulation.