Summary: Critical nets in $\mathbb{R}^k$ (sometimes called geodesic nets) are embedded graphs with the property that their embedding is a critical point of the total (edge) length functional and under the constraint that certain 1-valent vertices have a fixed position. In contrast to what happens on generic manifolds, we show that, if the embedding is bounded and $n$ is the number of 1-valent vertices, the total length of the edges not incident with a 1-valent vertex is bounded by $rn$ (where $r$ is the outer radius), the degree of any vertex is bounded by $n$ and that the number of edges (and hence the number of vertices) is bounded by $n\ell$ (where $\ell$ is related to the combinatorial diameter of the graph).

MSC:
53C22 Geodesics in global differential geometry
58E10 Variational problems in applications to the theory of geodesics (problems in one independent variable)
05C21 Flows in graphs
05C81 Random walks on graphs

Keywords:
geodesic nets; minimal immersions; Laplacian; isoperimetric inequalities

Full Text: DOI

References:

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