Mathematics > Differential Geometry

Ruled Laguerre minimal surfaces

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(Submitted on 1 Nov 2010)

A Laguerre minimal surface is an immersed surface in the Euclidean space being an extremal of the functional \int (H^2/K - 1) dA. In the present paper, we prove that the only ruled Laguerre minimal surfaces are up to isometry the surfaces R(u,v) = (Au, Bu, Cu + D cos 2u) + v (sin u, cos u, 0), where A, B, C, D are fixed real numbers. To achieve invariance under Laguerre transformations, we also derive all Laguerre minimal surfaces that are enveloped by a family of cones. The methodology is based on the isotropic model of Laguerre geometry. In this model a Laguerre minimal surface enveloped by a family of cones corresponds to a graph of a biharmonic function carrying a family of isotropic circles. We classify such functions by showing that the top view of the family of circles is a pencil.

Comments:	26 pages, 9 figures
Subjects:	**Differential Geometry (math.DG)**
MSC classes:	53A40, 49Q10, 31A30
Cite as:	**arXiv:1011.0272v1** [math.DG]

Submission history

From: Mikhail Skopenkov [view email]

[v1] Mon, 1 Nov 2010 09:26:56 GMT (4840kb,D)

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