ROTATING LIQUID DROPS AND DELAUNAY SURFACES

VLADIMIR I. PULOV AND IVAÏLO M. MLADENOV

Presented by Ivaïlo M. Mladenov

Abstract. Here we consider the problem of finding the equilibrium configurations of a rotating liquid drop, paying special attention to the cases when the droplet takes the shape of a Delaunay surface. By making use of the canonical forms of the elliptic integrals and the Jacobian elliptic functions we have derived several explicit parameterizations of the Delaunay surfaces. They are expressed relying on two independant real parameters accounting respectively the size and the shape so that all possible Delaunay surfaces are represented in a unified way.

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Keywords: Axially symmetric surfaces, capillarity, curves, elliptic integrals, fluid dynamics, Jacobian elliptic functions, parameterizations, surface geometry

Contents

1. Introduction

This paper is a continuation of our previous work [20], where we have considered the problem about the shape of the rotating liquid drop in the special case with a