

A new generation of cubic surface models: retrieving the Clebsch

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In the second half of the nineteenth century, the interest of mathematicians in algebraic geometry grew enormously. One of the reasons was the fascinating discovery of Salmon and Cayley in 1849: *Any smooth cubic surface contains precisely 27 lines*. Due to the great development, mathematical models were built in order to illustrate geometrical properties of some surfaces. One of these surfaces was the Clebsch diagonal surface, first defined by Clebsch in 1871. The Clebsch is a smooth cubic surface with the property that all its 27 lines are real. This surface has been built several times in the history of time. First in plaster (by Clebsch in 1872 and by the German firms Brill and Schilling. More recently, the sculptors Claudia Carola Weber and Ulrich Forster built the surface in clay (see [3]).

When a surface is built in plaster or in clay, the interior has to be filled in, in order to make the result solid. In this way, some of the mathematical properties may not be appreciated. As a consequence, mathematicians who work in this area nowadays use different kinds of software, see for example [2].

In this work, we present a polyester sculpture of the Clebsch surface and of two other cubic surfaces with singularities, with the purpose of fusing a precise mathematical visualization and the artistic representation. We also recall some classical mathematical properties of cubic surfaces [1], and discuss a more modern approach [4]. In this way, we aim to help the popularization of this particular area of mathematics.

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