

CONSIDERATIONS ABOUT GEOMETRIC MODELING OF COMPLEX SURFACES USING A POINT CLOUD RESULT FROM THE SCANNING OPERATION

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Abstract: *The paper presents the possibility to generate a complex surface using a point cloud result from the scanning operation at the real solid with a 3D scanner. Also, there is presented a way to optimize the scanned part with an eye to import the scanned part into 3D Unigraphics NX design software and different possibilities to achieve the solid body using a point cloud.*

Keywords: *scanning, point cloud, solid body*

1. Introduction

Reverse engineering is a rapidly evolving discipline, which covers a multitude of activities. In this paper we will only be concerned with reverse engineering of shape, but a broader interpretation of the term to involve understanding of design intents and mechanisms is also possible. While conventional engineering transforms engineering concepts and models into real parts, in reverse engineering real parts are transformed into engineering models and concepts. The advantages of the extensive use of CAD/CAM systems need not be reiterated here. The existence of a computer model provides enormous gains in improving the quality and efficiency of design, manufacture and analysis. Reverse engineering typically starts with measuring an existing object so that a surface or solid model can be deduced in order to exploit the advantages of CAD/CAM technologies. There are several application

areas of reverse engineering. It is often necessary to produce a copy of a part, when no original drawings or documentation are available. In other cases we may want to re-engineer an existing part, when analysis and modifications are required to construct a new improved product. It seems important to clearly distinguish between the concepts of a 3D copier and a 3D scanner. A photocopier takes a piece of paper and produces another piece of paper just like the original. A 3D copier is a device which takes a solid object and makes another one of just the same shape (let us ignore material). In fact, copy machining has been a well established technology for a long time. A scanner however, in 2D, not only inputs a page of text into the computer, but can also recognize the characters and figures, thus providing a text file and graphical structures. Similarly, a 3D scanner will not only capture raw data from the object, but the data will be interpreted and