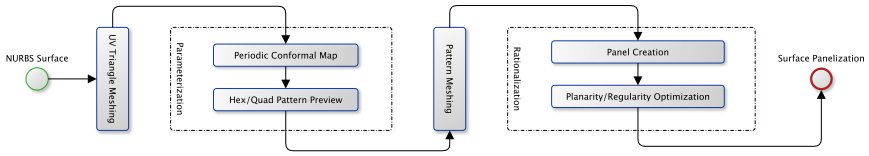

Figure 1: Flow diagram of the algorithms descripbed in this paper. From a NURBS surface a triangle mesh is created. The parameterization part is described in Section **??**. A pattern-mesh is created using this parameterization. The creation and optimization of panels is described in Sections **??** and **??**.

1 Introduction

The quality of a surface panelization solution can be defined in various ways. From an aesthetic point of view the shape of individual elements is important. Then there are global conditions such as alignment with surface boundaries and smooth transition of element shape. From the standpoint of fabrication, the elements should be repetitive and as regular as possible.
The contributions of this paper are:
Algorithm for quantized periodic parameterization: We present a new algorithm that maps a closed cylindrical surface to a periodic domain. This can either be cylinder or a cone of revolution. In both cases we obtain seamless patterns on the surfaces. The algorithm is based on discrete conformal maps of triangle meshes. It is an generalized version of the parameterization scheme described by [Springborn et al. 2008].
Algorithm for rationalization into a small number of regular elements: We show how the parameterization is used to subdivide a given closed surface into a small number of different regular elements.
Applications to architectural surfaces: We present examples where the described methods has been successfully applied to architectural surfaces.

The structure of this article is: Section **??** describes various parameterization schemes available to architectural geometers. We elaborate on why the current methods fail on the given task. Section **??** introduces the concept of periodic conformal parameterizations. See Figure 1 for a schematic view of the method. Section **??** describes a case study that lead to the development of this work. Section **??** deals with the optimization of panels to meet requirement posed during the case study. We give implementaional details in Section **??** and close with an outlook on further reasearch.

References

SPRINGBORN, B., SCHRÖDER, P., AND PINKALL, U. 2008. Conformal equivalence of triangle meshes. *ACM Trans. Graph. 27*, 3 (Aug.), 77:1–77:11.