

Deployable Honeycomb Structures

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Abstract

This paper presents the research on deployable structures consisting of linear folded stripes. The presented strategy extends the already described possibilities [1] of this particular system. This paper will discuss a strategy to generate equal sided hexagonal reticular structures based on a given surface, that will be materialised with freely oriented stripes [2].

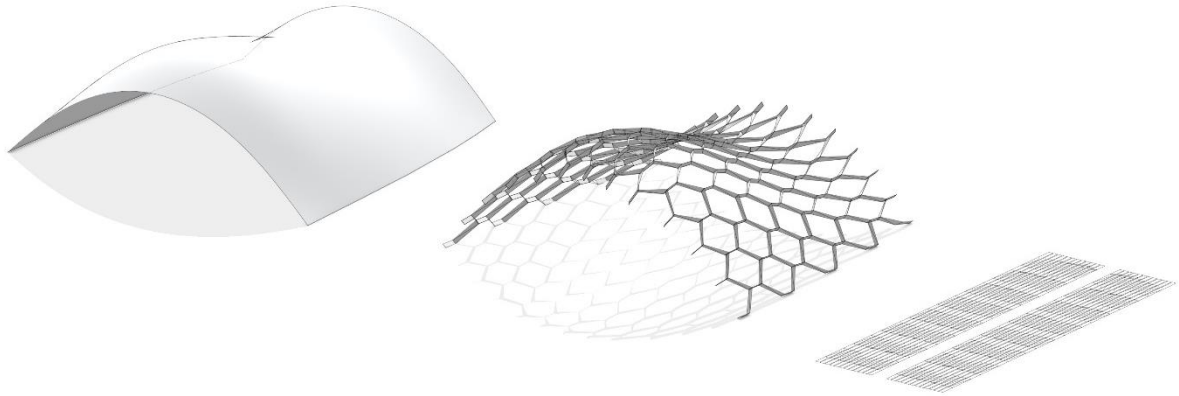


Figure 1: deployable stripes with the target surface

As the stripes are rectangular in their unrolled configuration, an investigation on these structures will lead to the development of three-dimensional structures that can be folded into a rectangular package of stripes, similar to honeycomb cores of classical sandwich panels [3].

The presented strategy enables the approximation of single as well as doubly curved surfaces.

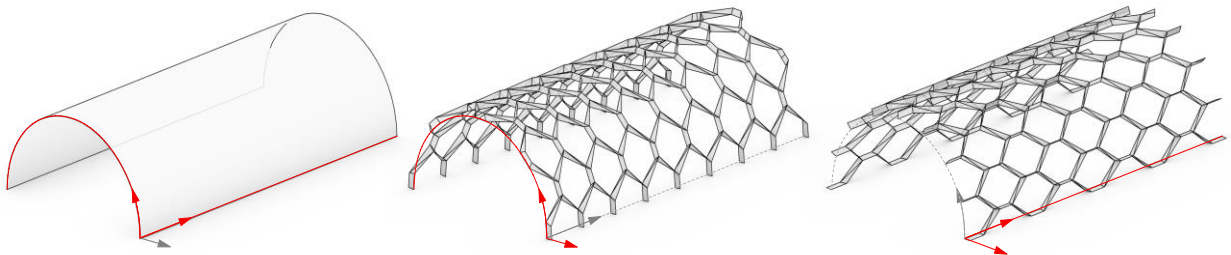


Figure 2: a cylindrical honeycomb structure from freely oriented stripes with two different Main Directions linked to the UV division

The generation of equal sided hexagonal line networks on a given target surface requires certain constraints. The Main Direction of the line network and the entire cell length based on the line segments lengths can be actively controlled. These parameters combined with number of cells define the entire length of every single polyline that represents one folded stripe.

This entire stripe-length can cause problems during the approximation process of given surfaces that vary in length along the U- or/and V- direction. These limitations and potential solutions will be discussed and presented.

Bibliography

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