

A Study of the Formation Process of the Fabric Drapes

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Abstract

In our experiments using a new apparatus, the drape formation process was found to consist of three stages, seeds generation, their development and the final stabilizing stages. A new parameter R evaluating the shape of the drape was defined in terms of the vertical projection of the drape. Both drape coefficient and R-parameter are expected to be useful for analyzing the formation process of the fabric drape quantitatively.

Introduction

The fabric drapability is an important factor from both aesthetic and practical points of view. Recently computer simulations of the fabric drape were rather successfully achieved. However, to make further improvements in these results, there needs more information, especially on the early stage of the drape formation. To analyze the whole process of the drape formation, a new apparatus, "drape elevator", was developed, which could evaluate the drape properties throughout the whole process of the drape formation continuously. In this study, the drape formation process including the seeds generation was considered in relation to the mechanical properties of the sample fabrics.

Experimental

The round sample holder of the drape elevator was made up of a fixed inner part and a movable outer part. As the movable part gradually moved down, the sample fabrics set on the sample holder hung correspondingly and formed drapes. The drapability can be evaluated using drape coefficient, number of nodes, R-parameter and so on at any points of the process of the drape formation.

Various kinds of woven fabrics of cotton, linen, wool, silk and polyester blended with wool were used as sample fabrics. The mechanical properties of these sample fabrics were measured by following the instructions of the KES methods.

Results

Using the apparatus, the initial stage of the nodes appearance could be observed. The nodes tended to appear at the areas of the low bending modulus and hysteresis in the fabric. The drape formation behaviors were often different even for the samples of the same drape coefficient. Adding the R-parameter, the drape formation process could be classified effectively and understood more clearly. The information including on the early stage of the process will play important roles for the improvements of the realistic computer simulations.