

3D Shape Knitting: Loop Alignment on a Surface with Positive Gaussian Curvature

Authors : C. T. Cheung, R. K. P. Ng, T. Y. Lo, Zhou Jinyun

Abstract : This paper aims at manipulating loop alignment in knitting a three-dimensional (3D) shape by its geometry. Two loop alignment methods are introduced to handle a surface with positive Gaussian curvature. As weft knitting is a two-dimensional (2D) knitting mechanism that the knitting cam carrying the feeders moves in two directions only, left and right, the knitted fabric generated grows in width and length but not in depth. Therefore, a 3D shape is required to be flattened to a 2D plane with surface area preserved for knitting. On this flattened plane, dimensional measurements are taken for loop alignment. The way these measurements being taken derived two different loop alignment methods. In this paper, only plain knitted structure was considered. Each knitted loop was taken as a basic unit for loop alignment in order to achieve the required geometric dimensions, without the inclusion of other stitches which give textural dimensions to the fabric. Two loop alignment methods were experimented and compared. Only one of these two can successfully preserve the dimensions of the shape.

Keywords : 3D knitting, 3D shape, loop alignment, positive Gaussian curvature

Conference Title : ICTF 2016 : International Conference on Textiles and Fashion

Conference Location : Singapore, Singapore

Conference Dates : March 03-04, 2016