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Topic of the Speech:

Application of Information Technology to the Field of Textile and Apparel

Professor Shigeru Inui

Shinshu university
Japan

Professor Shigeru Inui is a professor in Kansei engineering course, Faculty of Textile Science and Technology, Shinshu University. At the same time, he was a member of the Institute for Fiber Engineering, Interdisciplinary Cluster for Cutting Edge Research, Shinshu University. He is also Chairman of Educational Strategy Committee of Shinshu University Leading Graduate School "Global Leader Program for Fiber Renaissance".

He obtained his doctor of engineering at Kansei Production System, Shinshu University in 1998. He got his MS degree at the Department of Systems Science, Graduate School of Science and Engineering, Tokyo Institute of Technology in 1982. He graduated at the Department of Mechanical Engineering, Waseda University in 1980. He joined National Institute of Fiber and Polymer Materials, Agency of Industrial Science and Technology, Ministry of International Trade and Industry in 1984. Participated in a large-scale project "Development of automatic sewing system" by the Ministry of International Trade and Industry, and engaged in the research on the recognition and evaluation of the quality of sewing products and cloth simulation. Due to the organizational change, the National Institute of Fiber and Polymer Materials now has become the National Institute of Advanced Industrial Science and Technology (AIST). He became an associate professor in the Department of Kansei Engineering, Shinshu University in 2002. He has been studying to apply information technology including simulation to the field of textiles and fashion. He is currently interested in verifying local deformation behavior of yarn and cloth, verifying the predicted results of cloth and clothes simulation, simulation of fluid, heat, and moisture in clothes, and virtualizing clothes design.

ABSTRACT SUBMISSION

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Application of Information Technology to the Field of Textile and Apparel

Shigeru Inui[1*], Yosuke Horiba[1]

[1]*Shinshu unversity, 3-15-1 Tokida, Ueda, Nagano, 386-8567, Japany*

[*]Presenter's email: inui@shinshu-u.ac.jp

ABSTRACT (NO MORE THAN 500 WORDS:)

We are conducting research to apply information technology including simulation to the field of textiles and apparel. Here, as examples, we introduce the development of the cloth displacement measurement method, the simulation of the bellows action in clothes, and the research on virtualization of draping.

It is hard to say that the current fitting simulation of clothes is accurate enough to verify. In recent years, a function of predicting a three-dimensional shape of clothes has been introduced into an apparel CAD system which is a tool for pattern design. However, at the garment manufacturing site, it is said that the predicted shape may not necessarily match the actual shape. Therefore, the actual measurement result of the shape of the cloth is compared with the predicted shape by simulation to verify. For a real cloth, a three-dimensional displacement measurement apparatus is used to obtain a three-dimensional shape, and from the obtained data, the curvature at each position on the cloth is obtained. The curvature is also determined from the three-dimensional shape predicted by simulation, and comparison and verification are performed.

An attempt was made to simulate "bellows action" of clothes. Thermal comfort is one of the important factors in the comfort of clothes, and relates to air flow, heat and moisture in the air gap between the clothes and the body. It is very difficult to experimentally clarify such an environment in clothes. The simulation of bellows action was performed using computer fluid analysis (CFD). It was performed by CFD by the grid method. In this method, the simulation becomes difficult as the deformation becomes complicated. There is particle method in CFD as another method in which aggregation of fluid is presumed as particle. Since the particle method can flexibly cope with the deformation of the boundary, we tried the simulation by this method.

We are constructing a system in which draping is virtualized. Draping is one of the design methods of the pattern of clothes, and while it is possible to design clothes that fit the human body, it requires time and labour. We aim to make the processes more efficient by virtualizing. For virtual draping, we model cloth, hand, and dress form, which are elements that make up draping in the real world. The cloth model is deformed in the virtual space according to the dynamic formulation. A sensor is used to capture the hand movement in the real world, and the movement is reflected in the hand model. This enables manipulation of the cloth model in the virtual world by the hand movement in the real world. In addition, a dress form model is created from three-dimensional measurement data, and a cloth model is applied on the surface of the dress from to design a paper pattern. The aim is to make the pattern design of various clothes by adding dart and determining pattern boundary.