

# A Study on Heat Transfer through Plain Woven Fabric

## - An Approach through Finite Difference Method -

Young Sook Lee, Tae Jin Kang and Jae Kon Lee

Dept. of Textile Engineering, College of Engineering,  
Seoul National University, Seoul, Korea

The thermal insulation behavior in the human body - clothing - environmental system depends on the clothing structure and environmental condition. In particular, the heat transfer property of clothing depends on the structure of clothing system and fabric properties. Also, the fabric characteristics are changed by the fabric parameters such as structure and texture. Therefore, it is common to make the most primitive study on the thermal insulation characteristics of fabrics in the research of heat transfer characteristics of human body - clothing - environmental system.

In this study the finite difference method was used to analyze the heat transfer behavior of square plain woven fabrics using an unit cell structure model of square plain woven structure which was set up by the authors. The authors developed the finite difference equations of temperature distribution in thickness - direction of the unit cell and solutions were made for the some boundary conditions.

By the solutions, the temperature distribution in the thickness - direction of square plain woven structure were known.

In this study it was concluded that the unit cell model which was set up by the authors will be useful to analyze the heat transfer distribution in the thickness - direction of square plain woven fabrics using finite difference method.