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## Numerical Simulation of Deformation Behavior of Fabric Structures Under Bi-axial Load

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**Abstract:** Woven fabrics are used in various fields. That reason is the diversity which woven fabrics have. For example, generally woven fabrics are used for our clothing and bedding. Furthermore, woven fabrics are also used as the reinforcement of a composite material, a building component and an aviation component. When designing the structure which uses woven fabrics, we need to understand how woven fabrics are used with structure. Therefore, it is important to predict and understand the situation where woven fabrics are used, and its deformation act. This research proposes the numerical simulation using the finite element method as the technique of grasping the deformation behavior of woven fabrics. The numerical simulation targeted the woven fabrics under multi-axial loading. The experiment showed that woven fabrics with the characteristics of yarn and structure had affected the expression nature in a numerical simulation. Moreover, the expression nature of the deformation behavior of the woven fabrics under multi-axial loading has been improved by setting up a nonlinear Poisson's ratio as change in a cross sectional area to the elongation of yarn.

**Key Words:** [Woven fabric](#), [Yarn](#), [Woven structure](#), [Finite element method](#)

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