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Influence of Yarn Mechanical Properties on Internal Defects of Yarn Structures using Spring-Mass Models

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Abstract: In order to understand the relationship between the internal defects of yarn structures and the mechanical properties of yarn, we developed a yarn model which consists of mass and three types of springs for expression and construction, and bending. The yarn model can express the Euler buckling phenomenon depending on its bending stiffness. Using the yarn model, the tension relaxation simulations of the yarn package structures were performed, and it was found that our yarn model has a suffcient ability to express the influence of the bending property of yarn on the internal defects like the circular buckling of the yarn package structures.

Key Words: Yarn structure, Spring-mass model, Buckling, Bending property, Mechanical property

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