

MATERIALS AND STRUCTURES SYMPOSIUM (C2)  
Interactive Presentations (IP)

Author: Prof. Tuanjie Li  
Xidian University, China, tjli888@126.com

Mr. Tao Zhang  
China, zhangt058@126.com  
Dr. Yaqiong Tang  
Xidian University, China, xiaoqiongmmumu@hotmail.com  
Prof. Xiaofei Ma  
China, conceal123@126.com

NONLINEAR ELASTIC PARAMETER IDENTIFICATION OF KNITTED WIRE MESH STRUCTURE

**Abstract**

With the rapid development of communication technology, knitted wire mesh structure has been widely used in large deployable antennas to reflect electromagnetic wave. The knitted wire mesh is weaved by thousands of metal wires and its elastic parameters depend on many factors including woven form, dimensions, boundary loads and so on. Therefore, it is of great significance to study how to model the complex structure accurately and how to identify its nonlinear elastic parameters. In this paper, a method for recognizing the nonlinear elastic parameters of a small-size wire mesh was proposed. Firstly, an orthotropic plate bending structure was used to make the equivalent of the knitted wire mesh, and nine independent elastic parameters were chosen to describe the mechanical properties of the knitted wire mesh. Secondly, the mechanical model of the small-size wire mesh was established by Finite Element Method, and the change trends of nine independent elastic parameters with different boundary loads were investigated by simulations. Finally, a two-bar tricot knitted wire mesh structure was taken as a numerical example to verify the practicability of the proposed identification method.