Tohoku Univ. Technology

Method to measure independent elastic modulus without restriction on material type, form and measurement environment

Possible to measure 9 independent elastic modulus in a single vibration experiment and analysis without sample machining or surface treatment

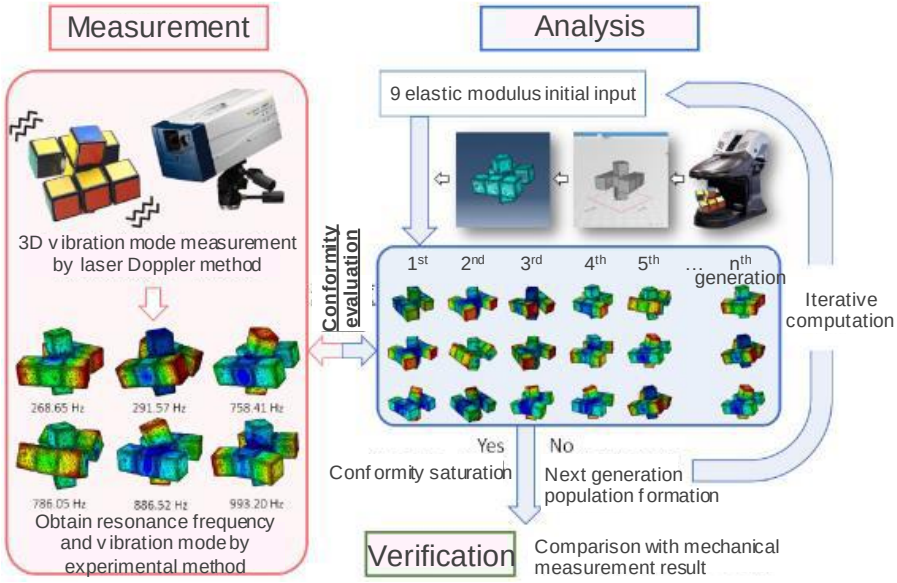
Overview

The measurement of elastic modulus, which is a fundamental parameter, is essential to characterize the material property. As an example of object with a simple linear shape, such as a stick, the elastic modulus can be obtained experimentally by tensile testing.

Today, a wide variety of object with complex shape can be formed due to the recent development of 3D printer technology. On the other hand, the elastic modulus of such object with complex shape having mechanical anisotropy, was difficult to simply measure by the conventional method.

This invention is about a simple method for measuring elastic modulus of object with complex shape having mechanical anisotropy. This invention compares at first the vibration mode obtained experimentally by the object resonance frequency using ultrasonic resonance method, with the estimated vibration mode. Then, the elastic modulus is determined after the inverse analysis so that the estimated vibration mode matches the experimental value. The elastic modulus is determined with high precision by applying an algorithmic tip to this comparison. The most significant feature of this measurement method is its simplicity since it requires only one vibration experiment and analysis to measure the 9 independent elastic modulus.

Features･Outstandings



Product Application

- Elastic modulus measurement device
- Elastic modulus measurement program
- Elastic modulus measurement contracted service

Related Works

[1] Industry-university collaboration platform for young researchers, NEDO, https://wakasapo.nedo.go.jp/seeds/seeds-1614

IP Data

IP No. : JP2022-151871
Inventor : YAMAMOTO Go, YUKI Shuma, SAKUDA Yuto
Admin No. : T22-140

Contact

Tohoku Techno Arch Co., Ltd.
Please visit CONTACT here