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Tesis: **"MEASUREMENT OF THREE-DIMENSIONAL DEFORMATION IN OBJECTS SUBJECTED TO VIBRATION"**

Resumen:

At present, the use of complex machines in the industry is quite common, where machines have to be productive and reliable. The design of each element of a machine is important, and we have to consider the presence of any strains, shears, moments and any other interaction force. All of these variables can be assessed by the measurement of displacement. Several methods enable us to measure generally one Cartesian component of displacement. In this work, we propose a method to measure the three-dimensional deformation (out-plane and in-plane components of displacement) of an element subjected to a periodic force, using a combination of fringe projection and digital image correlation; this method is able to obtain simultaneously the out-plane and in-plane components of displacement by means of only one recording. For this purpose, we use color encoding. Fringe projection and digital image correlation methods are optical methods that are non-contact and full-field. As application examples of the method, we analyze circular plates and membranes, which are made of different materials, when subjected to vibration. A high-speed camera is used for this purpose..