Volumetric Image Correlation

Hubert W. Schreier
Correlated Solutions, Inc., U. S. A.

The digital image correlation method has enjoyed growing popularity in the experimental mechanics community over the last decade due to its ease of use and high spatial and displacement resolution. However, using images acquired with optical cameras, the method is inherently limited to the measurement of displacements and strains on the surfaces of test objects. To overcome this limitation, researchers have extended the image correlation concept to volumetric image material that can be acquired, e.g., with CT-scanners. This approach permits direct measurement of the displacement vector field throughout the entire interior of a component. This presentation gives an overview of the volumetric image correlation method and the challenges in its implementation and application to real-world problems. A series of baseline experiments will be presented that demonstrate the typical bias in displacement and strain present in volumetric image data acquired with modern CT-scanners and a variety of application examples of the method will be shown.