

Experimental Stress Analysis

Assignment # 4

Three-dimensional Photoelasticity, Digital Photoelasticity

1. What is the difficulty in interpreting fringes in three-dimensional photoelasticity? How is this handled in various forms of three-dimensional photoelasticity?
 2. Briefly describe what is stress-freezing. How is this useful in solving three-dimensional problems?
 3. What is an optically equivalent model? What are the parameters that one needs to determine at a point of interest in integrated photoelasticity.
 4. Explain the basic principle involved in Digital Image processing. List at least five applications where DIP is extensively employed these days.
 5. What is meant by thresholding an image? What are the different criteria that are usually employed to determine the threshold value? What is meant by semi-thresholding and where is it used?
 6. What are the various methods for fringe thinning? Explain with neat sketches, the functioning of a binary based algorithm in fringe thinning.
 7. Mention the various steps involved in the global fringe thinning algorithm. What is the basic difficulty in handling fringes of arbitrary orientation? In what way the logical operators help in achieving fringe thinning for a generic problem? How to improve fringe skeleton extraction in high density fringe zones?
 8. Explain the methodology of Three Fringe Photoelasticity (TFP). Under what conditions does it fail? How is it overcome in Refined TFP? Explain with neat sketches.
 9. Briefly mention what are phase-shifting methods in photoelasticity? Mention the details of the ten-step method.
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