S19abstract.pdf

Dynamic electronic speckle pattern interferometry (DESPI) phase analyses with temporal Hilbert transform

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Abstract: In this study, we propose the Hilbert transform (HT) method for phase analysis of a Dynamic ESPI signal. The data processing is performed in the temporal domain, using the temporal history of the interference signal at every single pixel. The final results give a temporal development of the two-dimensional deformation field. To reduce the influence of the fluctuations of bias intensity on the calculated phase, it was removed prior to performing the HT. This method was demonstrated for defects distinction and the determination of the sign change in the deformation field in two different experiments. The range of measurement lies between sub-microns and tens of microns and the spatial resolution is better when compared to the fringe analysis method and the spatial carrier method.

OCIS codes: (120.6160) Speckle Interferometry; (100.2650) Fringe Analysis

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#2099 - $15.00 US
Received February 03, 2003; Revised March 18, 2003