Matched data storage in ESPI by combination of spatial phase shifting with temporal phase unwrapping

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Abstract

We combine the spatial phase-shifting technique with the real-time fringe counting capability of temporal phase unwrapping to provide simple solutions for some practical tasks in ESPI. First, we develop a method for automatically matched data storage intervals and apply this technique to a long-term observation of a biological object with strongly varying deformation rate. Second, we easily obtain on-line displacement and deformation data during the observation of a complexly structured discontinuous object. © 2000 Elsevier Science Ltd. All rights reserved.

1. Introduction

In interferometry, spatial phase shifting (SPS) has

Let us introduce the following notation: every object state is represented by a two-dimensional phase map $\varphi(x, y) \bmod 2\pi$; the suffix "$\bmod 2\pi$" will be omitted for

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would therefore be favourable if both, the temporally unwrapped data and several phase maps $\varphi(x, y)$ were stored for future processing. From these phase maps conventional

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