

Temporal phase-unwrapping of static surfaces with 2-sensitivity fringe-patterns

Servin M, Padilla J.M, Gonzalez Adonai, Garnica Guillermo

Optics Express. Vol. 23, Issue 12, pp. 15806-15815 (2015)

doi: 10.1364/OE.23.015806

Abstract

Here we describe a 2-step temporal phase unwrapping formula that uses 2-sensitivity demodulated phases for measuring static surfaces. The first phase demodulation has at most 1-wavelength sensitivity and the second one is G -times ($G \gg 1.0$) more sensitive. Measuring static surfaces with 2-sensitivity fringe patterns is well known and recent published methods combine 2-sensitivities measurements mostly by triangulation. Two important applications for our 2-step unwrapping algorithm is profilometry and synthetic aperture radar (SAR) interferometry. In these two applications the object or surface being analyzed is static and highly discontinuous; so temporal unwrapping is the best strategy to follow. Phase-demodulation in profilometry and SAR interferometry is very similar because both share similar mathematical models.