

Surface roughness evaluation using a direction field

A.G. Nalimov^{1,2}, V.V. Kotlyar^{1,2}, R.V. Skidanov^{1,2}

¹ Image Processing Systems Institute of RAS

² Samara State Aerospace University

Abstract

The paper describes a surface roughness measuring technique. Since the direct measurement of the surface roughness is complicated when roughness amplitude is small, the roughness is measured indirectly by measuring the dislocation density in the speckle interferogram. The relationship between the dislocation density and the roughness amplitude of the investigated surface is used. A directional field of the speckle interferogram is used to search for dislocations.

Keywords: direction field, surface roughness, speckle interferogram, dislocation density.

Citation: Nalimov AG, Kotlyar VV, Skidanov RV. Surface roughness evaluation using a direction field. *Computer Optics* 2003; 25: 71-73.

[Access full text \(in Russian\)](#)

References

- [1] Levin BJa. Distribution of zeros of entire functions. Providence, Rhode Island: American Mathematical Society; 1964.
- [2] Baranova NB, Zel'dovich BY. Dislocations of the wave-front surface and zeros of the amplitude. *Journal of Experimental and Theoretical Physics* 1981; 53(5): 925-929.
- [3] Skidanov RV, Nalimov AG. A method of detecting singular points of fingerprint images using a directional field. *Computer Optics* 2002; 23: 69-74.
- [4] Soifer VA, Kotlyar VV, Khonina SN, Khramov AG, Skidanov RV. Image recognition using a direction field technique. *Proc SPIE* 1998; 3346: 238-258.
- [5] Kotlyar VV. Methods for solving the phase problem in optics [In Russian]. The thesis for the Candidate's degree in Physics and Mathematical Sciences. Samara Branch of LPI; Samara; 1988.