

Fringe pattern analysis: some results and discussions

Qian Kemaο

Summary

When a fringe pattern is obtained, it needs to be analyzed in order to extract the desired information. In this talk, we are going to introduce some fringe pattern analysis techniques that we proposed recently, such as windowed Fourier transform (WFT) [1], coherence enhancing diffusion (CED) [2], and frequency-guided sequential demodulation (FSD) [3]. Some results, along with discussions, are given for the following cases:

1. Filtering one fringe pattern
2. Phase retrieval from one closed fringe pattern
3. Phase retrieval from one carrier fringe pattern
4. Phase shift retrieval from two fringe patterns
5. Phase retrieval from a sequence of fringe patterns with unknown phase shifts
6. Phase retrieval from a sequence of fringe patterns with known phase shifts
7. Filtering phase maps
8. Filtering based phase unwrapping

To conclude, although some advances have been seen through the years, developing accurate, automatic and accelerated (A3) algorithms for fringe pattern analysis is still an important, interesting and challenging task.

References

1. Q. Kemaο, Two-dimensional windowed Fourier transform for fringe pattern analysis: principles, applications and implementations, *Optics and Lasers in Engineering* 45, 304-317 (2007)
2. H. Wang, Q. Kemaο, W. Gao, F. Lin, H. S. Seah, Fringe pattern denoising using coherence enhancing diffusion, *Opt. Lett.* 34, 1141-1143 (2009)
3. Q. Kemaο, S. H. Soon, Sequential demodulation of a single fringe pattern guided by local frequencies, *Opt. Lett.* 32, 127-129, (2007)

