Reply

Vol. 24, No. 15 | 25 Jul 2016 | OPTICS EXPRESS 16499

Optics EXPRESS

Orthogonal basis with a conicoid first mode for shape specification of optical surfaces: reply

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Abstract: We present some comments to the paper "Orthogonal basis with a conicoid first mode for shape specification of optical surfaces: comment.'"

OCIS codes: (220.1250) Aspherics; (220.4830) Systems design; (220.4840) Testing; (220.4610) Optical fabrication; (000.4430) Numerical approximation and analysis.

References and links

1. C. Ferreira, José L. López, R. Navarro, and E. Pérez-Sinusía, "Orthogonal basis with a conicoid first mode for shape specification of optical surfaces," Opt. Express **24**(5), 5448–5462 (2016).
2. C. Ferreira, José L. López, R. Navarro, and E. Pérez-Sinusía, "Orthogonal basis with a conicoid first mode for shape specification of optical surfaces: erratum," Submitted (2016).
3. G. W. Forbes, "Comment on 'Orthogonal basis with a conicoid first mode for shape specification of optical surfaces,'" Opt. Express (in press).

1. Introduction

In page 5459 of reference [1], third line from bottom, the value $c = 0.261082$ obtained for the best-fit sphere curvature used in formula (42) is wrong. Consequently, the results pre-sented in Figure 7 (page 5461) are wrong as well. In [2] we have introduced the correct value $c = 0.964400103$. With this correction, Figure 7 of [1] should be replaced by Fig. 1. of [2]. In the discussion that Forbes included in his comment [3], he highlights several practical advantages of his Q^{bfs} polynomials. In particular he emphasizes that the Q^{bfs} polynomials ope-rate by reference to the displacement along the normal to the best-fit sphere instead of the sag (z-displacement) that is the case considered in our approach. Another advantage of the Q^{bfs} functions is avoiding the associated degeneracy of using a more general approach based on using best-fit conicoids instead of spheres. We agree that these features may have advantages for industrial applications. However, [1, 2] are a theoretical contribution in which we de-velop a rigorous method to obtain orthogonal systems where the first function q_0 is a sphere or conicoid. The implementation of numerical examples is only illustrative for the sake of placing this work in the context of the current state of the art of this particular topic, whereas the main contribution is the theoretical framework proposed in that article.

#268507
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http://dx.doi.org/10.1364/OE.24.016499
Received 17 Jun 2016; published 11 Jul 2016