New horizons for accurate photorefractive sight correction, afforded by novel flying spot technologies, require adequate measurements of photorefractive properties of an eye. Proposed techniques of eye refraction mapping present results of measurements for finite number of points of eye aperture, requiring to approximate these data by 3D surface. A technique of wave front approximation with Zernike polynomials is described, using optimization of the number of polynomial coefficients. Criterion of optimization is the nearest proximity of the resulted continuous surface to the values calculated for given discrete points. Methodology includes statistical evaluation of minimal root mean square deviation (RMSD) of transverse aberrations, in particular, varying consecutively the values of maximal coefficient indices of Zernike polynomials, recalculating the coefficients, and computing the value of RMSD. Optimization is finished at minimal value of RMSD. Formulas are given for computing ametropia, size of the spot of light on retina, caused by spherical aberration, coma, and astigmatism. Results are illustrated by experimental data, that could be of interest for other applications, where detailed evaluation of eye parameters is needed.
Keywords: eye aberrations, sight correction, photorefractive operations, eye refraction map, refraction non-homogeneity, Zernike polynomials, eye refraction measurement.

Full article