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## Exact analytical aberration theory of centered optical systems containing conic surfaces

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The paper presents the development of exact analytical aberration theory (EAAT) of centered optical systems for conic surfaces such as oblate spheroid, sphere, ellipsoid, paraboloid, and hyperboloid. Provided are theorems of conjugate points and surfaces. We mean paraxial achromatic points, anastigmatic, plan sagittal, plan tangential, flat-field, orthoscopic, and surfaces with corrected tangential or sagittal coma which exist in the object and image space of every centered optical system, containing conical surfaces. To calculate the coordinates of the above mentioned points and surfaces in the object and image spaces of the optical systems we present accurate formulae. EAAT is able to correct one or several aberrations by calculating the constructive parameters such as radii and axial thicknesses. Furthermore, it is also possible for optical components or systems to be synthesized with precise corrected image aberrations and with given in advance object aberrations (to compensate the aberrations of preceding systems). Both the accuracy of the aberration correction and the calculation of the parameters (excluding tangential and sagittal coma) is about  $10^{-10}$  mm. We present a variety of examples to illustrate the applied strength of EAAT. EAAT may be successfully used in all spheres of photonics and may accelerate drastically the research cycle in photonics technology.

### Biography

Boian Andonov Hristov is a Senior Research Fellow (Prof.) in Optics. His PhD is from Saint Petersburg State University of Information Technology, Russia. He had been member of the Faculty of the Military Institute of Optics and Laser Technology in Sofia, Bulgaria and member at the Institute of Optical Materials and Technology at the Bulgarian Academy of Sciences. He has published more than 60 papers in professional journals and proceedings from international conferences in Bulgarian, Russian and English. He is member of SPIE and has H-index 5.

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