

Home task 5

An optical system produces a monochromatic, converging, perfect spherical wave as its output, with paraxial marginal ray angle u_0 at the image point. Off-axis points are defined by the paraxial principal ray angle \bar{u} . Into this converging beam, a plane glass plate (window) is inserted. It has thickness d and refractive index n . The glass plate might introduce aberrations. Find the size of the aberration coefficients for the third-order monochromatic aberrations expressed in d , n , u_0 and \bar{u} ! Under what circumstances are there no aberrations?

Hint: Seidel sums. Also note the aberrations are independent of the position of the plate between the last lens and the image.