41. The Computation of the Path of a Ray and the Correction of the Aberrations of a Lens System. Part II.

By Tatsuro SUZUKI.

Faculty of Engineering, Osaka University.

(Comm. by M. MASIMA, M.J.A., April 12, 1951.)

The Correction of the Aberrations.

If it has been revealed as a result of trigonometric computations of the aberrations that the lens system has so large aberrations as unsuited to our purpose, we must correct them by changing slightly their curvatures and intervals of refracting surfaces or adopting another kind of glass. In the following section the method to obtain the suitable factor of modification of them will be discussed. For a while, let us regard the refractive index n to be a constant, which means that the kind of glass is not altered. As we shall be able to obtain easily the similar formulas even if n is regarded as a variable, the generality of the treatment is not disturbed by this simplification.

If the co-ordinates (h, θ) of an incident ray increase from (h, θ) to $(h+dh, \theta+d\theta)$, and the radius of the surface from r to $(r+dr)$, dh, $d\theta$ and dr being small fractions of h, θ and r respectively, then the co-ordinates of the refracted ray will be increased from (h', θ') to $(h'+dh', \theta'+d\theta')$.

Then, from (1) and (2) of the part I,

$$H' = \frac{1}{n}\frac{h}{h'}H = H, \tag{22}$$

$$d\theta' = A(R-H)+d\theta, \tag{23}$$

from (3) and (4)

$$H_{n+1} = B_nH_n+D_nK_n+E_nd\theta'_n, \tag{24}$$

$$d\theta_{n+1} = d\theta'_n, \tag{25}$$

where

$R = \frac{dr}{r}$: Factor of modification of radius.

$K = \frac{dC}{C}$: Factor of modification of the distance of the two consecutive centers of radius.

$H = \frac{dh}{h}$, $H' = \frac{dh'}{h'}$.