fourth diffractive zone 14, the value of Φ at each repeating cycle will be zero. This is shown in FIG. 4 where Φ_{11} and Φ_{51} are both zero. The width of each diffractive zone 12 is X_{i+1} - X_i as determined by the Fresnel equation above where X is in terms of radius r^2 and i is one of the values 0, 1, 2, or 3. The fraction of incident light energy focused at a particular diffraction order; being 0, +1, +2, +3, and +4; is referred to "diffraction efficiency" for focal points at distance, extended intermediate, intermediate, near intermediate, and near respectively.

[47] This structure is repeated on the lens surface along the direction of radius of the lens aperture. The OPD values at the two ends of each section of the four segments are the design values of the diffraction structure. The OPD distribution of the structure may be expressed with the following equation:

$$OPD(\mathrm{X}) = \begin{cases} \Phi_{11} + \dfrac{(\mathrm{X} - \mathrm{X}_0)(\Phi_{12} + n - \Phi_{11})}{\Delta \mathrm{X}} & \mathrm{X}_0 \le \mathrm{X} < \mathrm{X}_1 \\ \Phi_{21} + \dfrac{(\mathrm{X} - \mathrm{X}_1)(\Phi_{22} + n - \Phi_{21})}{\Delta \mathrm{X}} & \mathrm{X}_1 \le \mathrm{X} < \mathrm{X}_2 \\ \Phi_{31} + \dfrac{(\mathrm{X} - \mathrm{X}_2)(\Phi_{32} + n - \Phi_{31})}{\Delta \mathrm{X}} & \mathrm{X}_2 \le \mathrm{X} < \mathrm{X}_3 \\ \Phi_{41} + \dfrac{(\mathrm{X} - \mathrm{X}_3)(\Phi_{42} + n - \Phi_{41})}{\Delta \mathrm{X}} & \mathrm{X}_3 \le \mathrm{X} < \mathrm{X}_4 \\ \alpha + \beta X + \gamma X^2 + \delta X^3 & R_D^2 \le \mathrm{X} \le R^2 \end{cases}$$

Where

$$\Delta \mathrm{X} = \frac{2\lambda}{ADD}$$

$$\mathrm{X}_0 = 4\,\Delta \mathrm{X}\, Int\left(\frac{X}{4\,\Delta \mathrm{X}}\right)$$

$$\mathrm{X}_1 = \mathrm{X}_0 + \Delta \mathrm{X}$$

$$\mathrm{X}_2 = \mathrm{X}_0 + 2\,\Delta \mathrm{X}$$