$Κ(r,φ,α,θ\_{i})$ in Equation (4) represents the fibril density at each one of the 16 discretised orientations. Distribution of $Κ(r,φ,α,θ\_{i})$ was described using Zernike polynomials:

|  |  |  |
| --- | --- | --- |
|  | $$Κ\left(r,φ,α,θ\_{i}\right)=\sum\_{n=0}^{Order}\sum\_{m=-n:2:n}^{}C\_{n}^{m}∙Z\_{n}^{m}(r,φ)$$ | (8) |

Where Zernike term $Z\_{n}^{m}(r,φ)=\left\{\begin{array}{c}R\_{n}^{\left|m\right|}cos⁡(mφ)\\R\_{n}^{\left|m\right|}sin⁡(\left|m\right|φ)\\R\_{n}^{0}\end{array} \begin{matrix}m>0\\m<0\\m=0\end{matrix}\right.$, and $R\_{n}^{\left|m\right|}$($r$) is the radial polynomial defined as $\sum\_{i=0}^{\frac{n-\left|m\right|}{2}}\frac{\left(-1\right)^{k}\left(n-i\right)!r^{n-2i}}{i!\left(\frac{n+\left|m\right|}{2}-k\right)!\left(\frac{n-\left|m\right|}{2}\right)!}$ ($0\leq r\leq 1 $). $n$ and $m$ are intergers that represent polynomial order and the angular frequency, respectively. In this study, Zernike order was taken as 10 and the polynomial coefficients are listed below for 16 orientations respectively in four ocular zones, Tables 3 to 6. The polynomial coefficients were calculated based on least square minimisation:

|  |  |  |
| --- | --- | --- |
|  | $$\left[C\_{n}^{m}\right]=(\left[Z\_{n}^{m}\right]^{T}\left[Z\_{n}^{m}\right])^{-1}\left[Z\_{n}^{m}\right]^{T}[Κ]$$ | (9) |

Table 3 the value of coefficient $C\_{n}^{m}$by fitting a fibril distribution map in Zone 1. Angle $θ\_{i}$ represents 16 discretised fibril orientations defined in a local coordinate system at integration point, Figure 1. Each column of coefficients $C\_{n}^{m}$applies to calculate fibril density at one orientation, Equation (8).



Table 4 the value of coefficient $C\_{n}^{m}$by fitting a fibril distribution map in Zone 2.



Table 5 the value of coefficient $C\_{n}^{m}$by fitting a fibril distribution map in Zone 3.



Table 6 the value of coefficient $C\_{n}^{m}$by fitting a fibril distribution map in Zone 4.

