state, we obtain the classical Laplace's equation of orientation elasticity that governs the steady planar (2-D) director field of a nematic liquid crystal in any geometry [6]:

$$\nabla^2\theta = 0 \tag{31}$$

A general singular defect solution of the Laplace equation in polar (r,α) coordinates to the director angle θ is [6]

$$\theta(\alpha) = s\alpha + c \tag{32}$$

where c is an arbitrary constant and s is the strength of the defect. This singular solution is independent of the radial coordinate [6]. These singular defect solutions are known as wedge disclination lines and are always observed in nematic liquid crystals [6]. The name nematic means thread and refers to the disclination lines observed under cross polars [6]. Since the director orientation angle θ is governed by the linear Laplace operator (∇^2), the principle of superposition can be used to describe textures with two or more defects. The general solution to the Laplace equation in the presence of an arbitrary number n of defects of strength s_i, at a point N, is [6]

$$\theta = \sum_{i=1}^{n} s_i\alpha_i + c \tag{33}$$

where α_i is the polar angle of the ray originating at the defect of strength s_i and ending at point N, c is a constant and θ is the director angle at point N. For the planar polar