Orissa Journal of Physics
ISSN 0974-8202

Vol. 31, No. 1
February 2024
pp. 69 - 78

Gamma Function as an Optical Technique to Calculate Directionality Constant in a Glaucomatous Eye: Stiles Crawford Effect Revisited

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Received 11.11.23, Accepted 3.01.24

Abstract- In an optical system without aberrations, light entering the human pupil at its centre was several times more effective in creating the perception of vision than light entering the pupil's periphery. The Stiles-Crawford effect refers to this. The optic nerve, which carries visual information from the eye to the brain, can even be damaged in the disease known as glaucoma, in which the internal eye pressure (also known as intraocular pressure, or IOP) goes up to a lethal level. The visual field percentage is used to construct an equation for a glaucomatous eye that differs from the equation for a healthy eye. In this case, the integral equation is constructed using an optical method called the gamma function. The directionality constant value of the Stiles-Crawford effect, which is acquired by performing interference on the retina, satisfies this equation. The fact that an average 0.01 contrast threshold elevation is associated with roughly 2% visual field loss for an eye with glaucoma is proven by evaluating this equation term by term using Simpson's 1/3rd rule.

Index Terms-Glaucoma, Directionality constant, Visual field loss, Integral Equation