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The Comparison of Surgically Induced Astigmatism (SIA) Values using Three Holladay Incorporated Method SIA Calculators

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Postoperative residual astigmatism is one of the unsatisfying visual outcomes of phacoemulsification resulting from surgically induced astigmatism (SIA). Various SIA calculators have been introduced to assist the surgeons in calculating SIA for toric intraocular lens (IOL) determination. Aim of this study was to compare SIA values calculated using three different SIA calculators. A data set of 80 eyes from 72 subjects who had undergone uneventful phacoemulsification using < 3 mm clear corneal incisions technique were included in the study. The preoperative and postoperative K-values were computed into the three online Holladay incorporated method SIA calculators which were SIA Calculators Version 1.1 (SIAC1.1); Single Case SIA Calculators (SCSIAC); and Panacea SIA Calculator (Panacea). The mean individual SIA values obtained from each calculator were compared. There were no significant differences in mean individual SIA between the calculators ($p > 0.05$). Pearson's correlation coefficients for all compared calculators achieved 0.99. The ranges of 95% limit of agreement between calculators were too small and tight, ranged from -0.010 to 0.012 only. In conclusion, the SIAC1.1, SCSIAC and Panacea produced a comparable SIA value between calculators. Hence, either one can be used interchangeably.

Keywords : *Surgically Induced Astigmatism, SIA Calculator, Mean Individual SIA, Cataract Surgery*

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Numerical Algorithm for Solutions of Delay Differential Equations with Retarded Argument

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This paper presents the numerical solution for solving delay differential equations (DDEs) with retarded argument in multistep block method. The treatment for some features of DDE including non-vanishing lags and vanishing lags has been investigated. In this implementation, the PIE(CIE)s mode with the variable step size strategy has been applied to determine more than one approximate solutions that may produce in each steps of integration. In order to remain the fifth-order accuracy of the method, the retarded argument is approximated by a six points of Newton divided difference interpolation. Some theoretical results including order and error constant, consistency, zero-stable, convergence, and the analysis of the P-stability and Q-stability are presented. Numerical results for all tested problems are compared with the other DDE solvers to show the efficiency of the proposed method.

Keywords : *Delay Differential Equations, Retarded Argument, Non-vanishing Lag, Vanishing Lag, Multistep Block Method*