MUHAMMAD SUFYAN, University of Punjab Gujranwala Campus
Mathematical Modeling of Transmission of Dynamics of HIV/AIDS and other viral disease

Numerical Modeling comprises construction, application and analysis of reliable numerical schemes to solve continuous models. These schemes are constructed with the aim that discrete model displays the same behavior as the continuous model. Discrete models must have some very important properties like stability, dynamical consistency, positivity and boundedness of the solution. In this dissertation , a dynamical model for the transmission dynamics of HIV/AIDS and a dynamical model for the transmission dynamics of Dengue fever has been constructed by introducing a new partition of SIR Model.Using standard methods for analyzing a system, the stability of disease free equilibrium point of this immunization based model has been determined. Finally an unconditional numerical model has been constructed and analyzed for the same problem and numerical experiments are performed for different values of discretizations parameter "h". Results are compared with well known numerical scheme i.e. Euler's and Runge-Kutta method of order four (RK-4), Unlike Euler's RK-4 which fails for large time steps, the developed numerical scheme for the HIV/AIDS model gives results that converged to steady states of the continuous model for any time step used.