# Numerical modeling

Numerical modeling of communicable disease is a device to understand the instrument of how disease blowouts and how it can be measured. we have studied numerically the dynamics of typhoid fever disease in this paper. We frame an unconditionally stable Non-Standard Finite Difference (NSFD) scheme for a mathematical model of Typhoid Fever Disease.

The introduce numerical scheme is bounded, dynamically include and describe the positivity of the solution, which is one of the important requirements when modeling a prevalent disease. The comparison among the developed Non-Standard Finite Difference scheme, Euler method and Runge-Kutta method of order four (RK-4) shows the effectiveness of the proposed Non-Standard Finite Difference scheme. NSFD scheme shows convergence to the true equilibrium points of the model for any time steps used but Euler and RK-4 fail for large time steps.

Key Words: Typhoid Disease, Dynamical System, Numerical Modeling, Convergence. Introduction Typhoid fever affects millions of people worldwide each year, where over 20 million cases are reported and kills approximately 200, 000 annually. For instance, in Africa it is estimated that annually 400, 000 cases happen and an incidence of 50 per 100, 000 [5].

The mathematical modeling for transmission dynamics of typhoid fever disease is a capable approach to appreciate the behavior of disease in a population and on this basis, some capable measures can be modeled to prevent infection. Dynamical models for the transmission of disease objects in a human population, based on the Kermack and McKendrick SIR classical epidemic model [1–4], were proposed. These models deliver evaluations for the temporal advancement of infected nodes in a population [5–13].

In this paper we construct an unreservedly convergent numerical model for the transmission dynamics for typhoid fever disease which preserves all the essential properties of the continuous model. We considered the mathematical model of disease transmission in a population that has been discussed by Pitzer in [6].

Mathematical ModelA: Variables and ParametersS(t): Susceptible entities class at time t. P(t): Protected individual class at time t. I(t): Infected individuals class at time t. T(t): Treated class time t.?: The rate at which individuals recruited.?: Natural death rate. ?: Loss of protection rate.?: Rate of infection.?: Rate of treatment.?: Disease induced mortality rate.