An explicit, chaos-free, non-standard scheme for an epidemiological model

Abba Gumel

gumelab@cc.umanitoba.ca

University of Manitoba, Canada

An implicitly-derived, explicit, non-standard finite-difference scheme will be constructed for a non-linear deterministic model of disease transmission and control. Unlike some standard schemes such as the fourth-order Runge-Kutta method (RK4), which induce contrived numerical instabilities (e.g. oscillations, chaos and convergence to spurious zeros) for certain parameter values and time-steps, the Gauss-Seidel-type non-standard method will be seen to be free of numerical instabilities for all parameter values and time-steps.