Soft computing paradigms to find the numerical solutions of a nonlinear influenza disease model

ABSTRACT

The aim of this work is to present the numerical results of the influenza disease nonlinear system using the feed forward artificial neural networks (ANNs) along with the optimization of the combination of global and local search schemes. The genetic algorithm (GA) and active-set method (ASM), i.e., GA-ASM, are implemented as global and local search schemes. The mathematical nonlinear influenza disease system is dependent of four classes, susceptible S(u), infected I(u), recovered R(u) and cross-immune individuals C(u). For the solutions of these classes based on influenza disease system, the design of an objective function is presented using these differential system equations and its corresponding initial conditions. The optimization of this objective function is using the hybrid computing combination of GA-ASM for solving all classes of the influenza disease nonlinear system. The obtained numerical results will be compared by the Adams numerical results to check the authenticity of the designed ANN-GA-ASM. In addition, the designed approach through statistical based operators shows the consistency and stability for solving the influenza disease nonlinear system.