Abstract
A comprehensive deterministic HIV/AIDS transmission model incorporating social behaviour, treatment, vaccination, stages of infection, age structures, discrete time delay and vertical transmission is presented and rigorously analyzed. Two age structures are considered with group one consisting of children aged (0 - a) years and group two consisting of adults aged (a) years and above. In this study we investigate wether a trade-off exists between vaccination and treatment. Numerical simulations shows that treatment that does not reduce infectiousness is worse than when the treatment is not applied at all, however when coupled with effective counseling, then it is very effective in combating the spread of the disease and finally eliminating it. A trade off seems to exists between vaccination and treatment and therefore careful considerations should be made when vaccination and treatment is to be applied together because a combination of the two could be counterproductive or helpful depending on how it is implemented.