Nonstandard Finite-Difference Methods for Dynamical Systems in Biology

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A brief overview of the nonstandard finite-difference methods is presented. Next, using the nonstandard discretization approach, a positive and elementary stable numerical method is developed for productive-destructive systems. Finally, a nonstandard finite-difference method for general autonomous dynamical systems is constructed. The proposed numerical methods preserve the positivity of solutions and the local behavior of the corresponding dynamical systems near equilibria; and are also computationally efficient and easy to implement. Applications to select problems in biology are given to demonstrate the performance of the new methods.

References

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