New Modified Bernoulli Wavelets Matrix Approach for the HIV Infection Model

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ABSTRACT

In this study, we generated a novel functional matrix using Bernoulli wavelets. Also, developed a novel technique called the Bernoulli wavelets collocation method to obtain fairly accurate solutions for the HIV-infection model of CD4+T cells. This mathematical model is in the form of a system of a nonlinear ordinary differential equation (ODE). This approach obtains the solution for this model by transforming it into a system of nonlinear algebraic equations by expanding through Bernoulli wavelets with unknown coefficients. These unknown coefficients are calculated using the collocation scheme. The consistency and proficiency of the developed approach are demonstrated through tables and graphs. Obtained results reveal that the current approach is more accurate than other methods in the literature. All computations have been made with the help of Mathematica software. Some properties of Bernoulli wavelets are discussed in terms of theorems.

Keywords: Mathematical model for the HIV model, Bernoulli wavelets, functional matrix, collocation technique.

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