

***Legendre wavelet collocation method for stochastic fractional  
integro-differential equation***

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The numerical methods based on operational matrices for the fractional differential equations have been widely studied in the last decade. In the wavelet method based on orthogonal polynomials, the operational matrices for wavelets are derived using other functions (block pulse and hat function) that lead to an approximation error. In contrast to the existing methods, here we derive the expressions for operational matrices without using the usual block pulse and hat function, aiming to remove the approximation error. Furthermore, we design a Legendre wavelet collocation method involving different operational matrices for solving the stochastic fractional integro differential equation (SFIDE). Thereafter, making use of the wavelet approximation, operational matrices, and collocation points, we convert the considered SFIDE into a system of algebraic equations. Finally, we investigate the accuracy and efficiency of the numerical method through test examples.

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