Approximate series solutions of a one-factor term structure model for bond pricing

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Description
One-factor term structure model in finance and economic setups conveys the opinion that there exists only one Brownian process in the formulation of the short rate model as one source of randomness. To extend the theory, in this paper, we develop the approximate solution of a one-factor bond pricing model that can be used to obtain solutions of both nonlinear and multi-factor models and get applications of two proposed solution methods: Elzaki Adomian decomposition method (EADM) and Laplace Adomian decomposition solution method (LADM). We first obtain an efficient, reliable and approximate-analytical solution for a one-factor bond pricing model. We provide illustrative examples that are in good agreement when compared with those already in literature. The methods are very effective in the application being the modified version of the classical Elzaki, and Laplace transforms. Since our proposed methods are effective and efficient, we recommend academics and practitioners apply our proposed model to obtain solutions for some financial models, including both the multi-factor and nonlinear models.