Application of Bernoulli polynomials for solving fractional Riccati differential equations

Parisa Rahimkhani (Alzahra university), Yadollah Ordokhani

In this paper, a collocation method based on the Bernoulli polynomials is presented for the nonlinear Riccati differential equations with fractional order. The fractional derivatives are described in the Caputo sense. The method is based upon Bernoulli polynomials approximations. First, the Bernoulli polynomials and some their properties are presented. Also, an operational matrix of fractional order integration is derived and is utilized to reduce the initial value problems to system of algebraic equations. The technique is applied to some problems to demonstrate the validity and applicability of the proposed method.