

COMPUTATIONAL APPROACH TO RICCATI DIFFERENTIAL EQUATIONS

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ABSTRACT

Riccati differential equation is one of the most essential tools for modelling many physical situations, such as spring mass systems, resistor-capacitor-induction circuits, and chemical reactions among many others. It is applicable in engineering and science, and also useful in network synthesis and optimal control. We derived a quarter-step method for the solution of RDEs by collocating and interpolating the Laguerre polynomial basis function which does not require starting values before they are implemented and they simultaneously generate approximations at different grid points in the interval of integration. To show the accuracy and efficiency of our method, five (5) model RDE problems were solved and results obtained in terms of the point wise absolute errors shows that the method approximates well with the exact solution. The stability analysis conducted reveals that our method is zero-stable, consistent and convergent.

KEYWORDS: *Lequerre Polynomial, Blockhybrid Method, Ricatti Differential Equation, Integration Interval, Weight Function*

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