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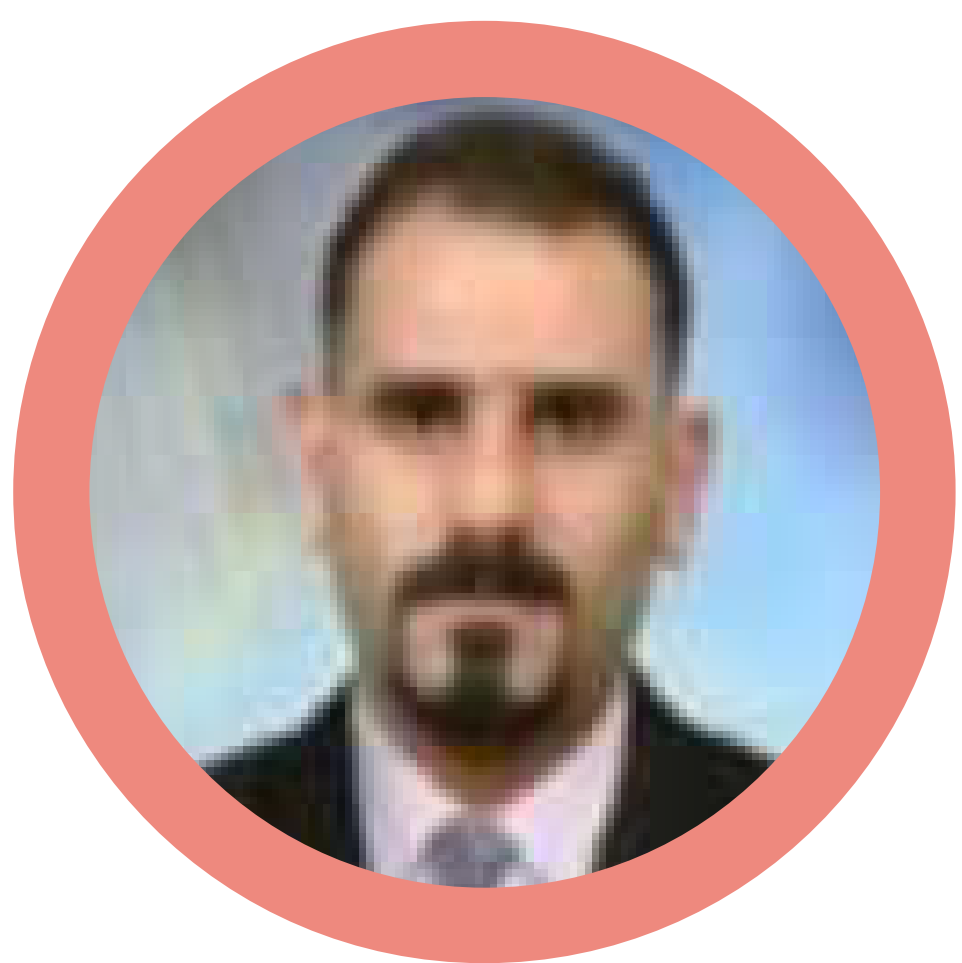
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A NEW TECHNIQUE OF SEMI ANALYTIC APPROACH ALPHA-HOMO FOR OBTAINING THE ANALYTIC SOLUTION TO QUADRATIC DIFFERENTIAL EQUATIONS: THEORY AND APPLICATIONS

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Background. Dr. Khalid Hammood Al-Jizani is a lecturer at the Department of Mathematics, College of Science, Mustansiriyah University. He obtained his BSc (Mathematics) from University of Baghdad in 2003 and his MSc (Mathematics) from Mustansiriyah University in 2008. Recently, he received his Ph.D. in Mathematics from School of Mathematical Sciences, Universiti Sains Malaysia in 2019 under the great supervision of Assoc. Prof. Dr. Noor Atinah Ahmad. His Ph.D. research focused on methods for approximating and stabilizing the solution of nonlinear Riccati matrix delay differential equations. He has published in several Scopus and ISI-indexed journals and has presented in a number of conferences.

Abstract. In this work, an *alpha*-Homo technique for solving quadratic differential equations is presented by introducing an auxiliary parameter *alpha*, such that *alpha* is a small value (generally is less than one) for improving the area of convergence and getting a wider convergence region of the iterative sequence. *alpha*-Homo is a modification of the homotopy approach (MHAM or *alpha*-Homotopy). The solutions of the equations obtained using the classical homotopy analysis method (HAM) give good approximations only in the neighborhood of the initial position. The main advantage of the present technique is that it can enlarge and extend the convergence region of iterative approximate solutions. Hence, the results conducted via *alpha*-Homotopy give better approximations for bigger and wider interval time given, instead of only the local vicinity of the initial point. Some theorems have been proved. Numerical results obtained show that this technique is more accurate, easy to execute, and effective.

Date: 10 December 2021 (Friday)
Time: 3:00-4:00 PM (Malaysia time)
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