# Barycentric Lagrange interpolation for solving Volterra integral equations of the second kind

*Basma Magdy Ahmed Mohamed ,E S Shoukralla , H Elgohary*

**Abstract**

An improved version of Barycentric Lagrange interpolation with uniformly spaced interpolation nodes is established and applied to solve Volterra integral equations of the second kind. The given data function and the unknown functions are transformed into two separate interpolants of the same degree, while the kernel is interpolated twice. The presented technique provides the possibility to reduce the solution of the Volterra equation into an equivalent algebraic linear system in matrix form without any need to apply collocation points. Convergence in the mean of the solution is proved and the error norm estimation is found to be equal to zero. Moreover, the improved Barycentric numerical solutions converge to the exact ones, which ensures the accuracy, efficiency, and authenticity of the presented method.

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