A class of multivalue-multistage schemes for the numerical solution of Volterra integral equations

Ali Abdi Kalasour (University of Tabriz), Seyyed Ahmad Hosseini, Gholam Reza Hojjati

We are going to investigate a class of general linear methods combined with a quadrature rule for the numerical solution of Volterra integral equations (VIEs) of the second kind. We construct such methods up to order four in which the methods of orders one and two are $A-$ and $V_0(\alpha)$–stable, with maximum value for α, and methods of orders three and four are stable with a large region of absolute stability. The efficiency and capability of the introduced schemes are verified by solving some stiff and nonstiff VIEs.
Keywords: Volterra integral equations, General linear methods, Order conditions, Stability analysis.