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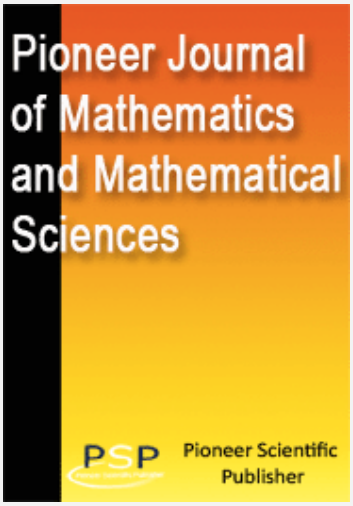

INTEGRAL VARIANT OF THE TAU METHODS FOR ORDINARY DIFFERENTIAL EQUATIONS (IVPS) INVOLVING MAXIMUM OF FOUR TAU PARAMETERS

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Abstract

This paper concerns the Lanczos' Tau Method for the numerical solution of Ordinary Differential Equations (ODE). The integral variant of the Tau method is considered here. The general expressions for elements of the Tau matrix equation involved in the integrated variant of the Tau method for the m-th order linear ODE and the corresponding general error estimates for the class were obtained. Perturbing the integrated error equation improve the accuracy of the estimate significantly. The error estimation was based on the error of the Lanczos economization process and it satisfies the Corresponding Perturbed Differential Equation (PEDE). We integrate through this PEDE and consequently increased the order of the perturbation term leading to an increased in the accuracy of the result obtained. Members of the class of problems characterized by $m + s = 4$, were investigated for study, where m and s are the order of the differential equations and the number of overdetermination, respectively. Consequently, a generalized Tau matrix system was constructed for the m-th order linear ODEs and a generalized error estimates for the class of problems with maximum of three overdeterminations were obtained.

Keywords and phrases: integral, Tau method, variant, error estimate, approximant, order, overdetermination, perturbation.