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Multistage Adomian Decomposition Method for Solving Linear and Non-Linear Stiff System of Ordinary Differential Equations

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Abstract : In this paper, linear and non-linear stiff systems of ordinary differential equations are solved by the classical Adomian decomposition method (ADM) and the multi-stage Adomian decomposition method (MADM). The MADM is a technique adapted from the standard Adomian decomposition method (ADM) where standard ADM is converted into a hybrid numeric-analytic method called the multistage ADM (MADM). The MADM is tested for several examples. Comparisons with an explicit Runge-Kutta-type method (RK) and the classical ADM demonstrate the limitations of ADM and promising capability of the MADM for solving stiff initial value problems (IVPs).

Keywords : stiff system of ODEs, Runge-Kutta Type Method, Adomian decomposition method, Multistage ADM
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