On Approximate Analytical and Decomposition Algorithms of Investigation Some Non-Classical Problems

G. Dattoli – ENEA Research Center in Frascati
D. Gordeziani – Tbilisi State University
E. Gordeziani – Tbilisi State University

Abstract

The current work deals with investigation and development of efficient algorithms for solution of certain mathematical models describing non-linear processes in physics and ecology. Particularly derivation of problems considered below deals with application of high intensity electron accelerators and pollution diffusion processes in the waters. In the wok by G. Dattoli, M. Migliorati and A. Schiavi by the title " Study of Coherent Synchrotron Radiation Effects by Means of a New Simulation Code Based on the Nonlinear Extension of the Operator Splitting Method" one can find quite complicated mathematical model describing these non-linear processes, which generate very interesting non-classical problems as from mathematical also from practical point of view.

In the present work we make attempts to find other effective methods of solution the problem stated in the mentioned article for improvement the results obtained, and the main goal is in applying the modified algorithms for little bit complicated case, when in the equation is also included second order derivative of unknown function with respect to first space variable. Also should be emphasized interesting class of problems from ecology and physics for pluri-parabolic and Pluri-Shcrodinger equations. For all above mentioned problems we use operator split technique in synthesis with approximate-analytical method.