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APPLICATION OF DM METHODS FOR PROBLEMS IN MATHEMATICAL PHYSICS

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Degenerate matrices methods for solving ODE were introduced at the end of previous century. These are based on applying matrices of two types: a matrix $\mathbf{A}_N$ for the approximation of a derivative which is always degenerate and its pseudoinverse $\mathbf{B}_N$ which can be both degenerate and nondegenerate [1]. Matrix $\mathbf{A}_N$ is determined uniquely by the choice of nodes on the given interval. One presents the nonsaturated approximation for the derivative of a function when $N \to +\infty$, if the nodes are distributed as zeroes of classical orthogonal polynomials. Thus, the precision of an approximation of the derivative by matrix $\mathbf{A}_N$ depends of two independent parameters: on degree N of $\mathbf{A}_N$ and on the length h of approximable interval (or on the step h). Such DM methods using two independent parameters with a view to decrease the precision of the the solution of ODE is considered more explicitly. We recommend to use also these methods in the educational programs for students.

Then are analyzed the applications of DM methods for boundary-value problems of ODE and also for problems of PDE [2]. The solutions of several concrete nontrivial problems for PDE obtained by DM methods are considered.

REFERENCES

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