On modified computing schemes of the spline-collocation method for solving integral equations of the second kind

Vladislav Seichiuc, Eleonora Seichiuc, Gheorghe Carmocanu

Trade Co-operative University of Moldova, Moldova State University
e-mail: `seiciuc@mail.ru`

The Intelligent Support System (ISS) for approximate solving of the Fredholm and Volterra integral equations (IE) of the second kind (ISS_IE) utilizes the following results (see [1]):
– computing algorithms of spline-collocations method for solving the Fredholm and Volterra IE of the second kind, which essentially use the linear splines as basic functions for modeling and presenting the unknown solutions;
– a theoretical substantiation of the developed computing algorithms, obtained in the space of continuous functions and in the Hölder spaces, which is based on the results of function approximation with its linear polygons;
– the core developed component of ISS_IE, called the Base of Kernel Prototypes of IE (BKP_IE_COL) and destined for solving IE by spline-collocations method, which directly depends on the used splines in the calculation algorithm.
In this paper, for more efficient use of ISS_IE, we study the possibility to build computational schemes based on certain types of second order fundamental splines. There were obtained:
– computational schemes of spline-collocations method for solving IE of the second kind on the basis of some fundamental splines of second order;
– results on approximation of the function with used second order splines;
– a theoretical substantiation of the new developed computing algorithms in the space of continuous functions based on the results of function approximation with used second order splines;
– the extension of the Base BKP_IE_COL, destined for solving IE with spline-collocations method, using the splines of the second order.