SOFTWARE PACKAGE "APPROKRIO" FOR APPROXIMATION TEMPERATURE CHARACTERISTICS AND SENSITIVITY OF SENSOR

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To describe sensor static characteristics, rupture minimax polynomial splines, in which approximations on distinct links are selected in such a way that a characteristic approximation error does not exceed a priory of certain value at any range point, are used frequently. The application expediency of such splines with dividing minimax approximation on the distinct parts of the measurement range could be justified by the possibility of gaining the approximation of the necessary accuracy at small values of parameters' quantity in polynomial approximation. Such approximations continued on distinct links (parts of the measurement range) could be used if a determining condition is the provision of function value of reproduction with an error only. The example of such a task is the determination of a functional dependence for the description of thermotransducer static characteristics. However, to explore sensor sensitivity, these rupture approximations could not be employed, since derivative values at rupture points have considerable discrepancies. To approximate the thermometric characteristic of silicon diode temperature sensors and their sensitivity, Chebyshov's polynomial approximations by the method of the smallest squares, meanwhile, the satisfactory accuracy of sensor thermometric characteristic and its sensitivity approximation is being reached at hundredth and higher Chebyshov polynomial degree, which complicates the practical implementations of such approximations due to pulsations relevant to high degrees.

It is important to develop a software algorithm of the construction of continued and smooth minimax spline-approximation with the given error. Therefore, the developed software package "AproKrio" is intended for solving optimization problems given in a tabular presentation of analytical precision of low temperature (cryogenic) characteristics of the sensor means uniform (Chebyshov) approximation. Core package "ApproKrio" are approximation modules focused on determining Chebyshov approximation expressions with specific interpolation conditions. 52 modules of approximation which implement the methods of calculation of parameters with Chebyshov approximation, are included in the package. In addition, 17 more interpolation modules are given to determine the interpolation expressions, of which 15 provide the definition of Hermitian interpolation. The research contains the functionality package "ApproKrio". Its purpose and features of application are discussed in it.

Keywords – Chebyshov approximation, continuous and smooth minimaximal spline approximation, spline approximation, package "AproKrio"