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ABSTRACT

HIGH DIMENSIONAL MODEL REPRESENTATION APPLICATIONS ON THE PRODUCTION OF THE VALUES FOR A FUNCTION and PARTIAL DERIVATIVES FROM A DATA SET AND NO FLUCTUATION APPROXIMATION ON UNIVARIATE INTEGRATION

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In this work we dealt with developing a method to fit a function to the data given, where the exact analytical form of the considered function is not known. Here, we worked with univariate functions. To develop this method, we used High Dimensional Model Representation (HDMR) and constancy measurer optimization. Additivity measurers are used to compare HDMR approximation with the original function. Constancy measurer compares the approximation which only contains the constant term with the original function. We used orthonormal basis functions in our approximation. This method is also used for regions which do not have regular grid structure, with the aid of some geometrical transformations. These transformations are realised by mapping a trapezoidal region to a rectangular region. We also worked on a method which gives partial derivativatives of a given n-dimensional data set. We also used fluctuation free approximation for approximately evaluating integral of a given data set. In an additional work, we also study the effect of weight functions to the eigenvalues of universal X matrix. On the other hand, we developed a new concept, the weight function generators to obtain better results to find the integral of a given data set with fluctuation free approximation.