

APPROXIMATION OF DERIVATIVES USING F-TRANSFORMS BASED ON HIGHER DEGREE SPLINES¹

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The direct and inverse fuzzy transforms (F-transforms) [1] had been introduced by I. Perfilieva. The key elements of F-transforms are basic functions forming a fuzzy partition of a given interval. We work with generalized basic functions of bandwidth m (m -partition) in the sense of L. Stefanini [2] and investigate the corresponding $F^{(m)}$ -transforms. The fuzzy m -partition in our research is defined by polynomial splines of a special design and degree m .

This talk is devoted to approximation error estimation for the technique of $F^{(m)}$ -transforms. We consider the inverse $F^{(m)}$ -transform as an approximation tool not only for original functions but also for their derivatives. We generalize the results on approximation properties of this technique proved in our previous paper [3], where quadratic and cubic splines have been considered for generating fuzzy partitions. The obtained results are compared with the error bounds proved in [4] for the case of higher order F-transforms, which essentially differs from the case of higher degree basic functions considered above.

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