On optimal recovery problems
in semi-linear metric spaces

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We consider optimal recovery problems for functions and integrals on classes of functions that take values in semi-linear metric spaces (L-spaces) and such that the functions themselves or their Hukuhara-type derivatives have a given majorant of the modulus of continuity. The recovery is made based on n values of the function or on the function's n mean values over intervals. We also obtain sharp Landau type inequalities and solve an analog of the Stechkin problem about approximation of unbounded operators by bounded ones and the problem of optimal recovery of an unbounded operator on a class of elements, known with error. A key role in obtaining our results is played by the generalization of the well-known Korneichuk–Stechkin lemma to the case of functions with values in L-spaces. The use of functions with values in L-spaces allows, in particular cases, to obtain results on the optimal recovery of operators on classes of multi-valued, fuzzy-valued, and Banach-valued functions (in particular, random processes).