Nurlan Temirgaliev
Gumilev Eurasian Nat. Univ. Astana, Kazakhstan

To a question on features of the general statement of a problem of optimal reconstruction under the unexact information

Optimization problem in (1-5) differ both in productions and, interestingly, the designations employed essentially the same mathematical objects, and in the formulation of the results. Common in the formulation of reconstruction Tf operator on inaccurate information f The following definition:

$$\delta_{\mathrm{N}}\left(\varepsilon^{(N)}\right)=\inf_{\left(l^{(N)},\varphi_N\right)\in D_N}\sup\left\{\|Tf-\varphi_N(z_1,...,z_k;\cdot)\|_Y;\ \begin{array}{c} f=(f_1,...,f_n)\in F \\ (z_1,...,z_k):\left|l_j^{(i)}(f)-z_j^{(i)}\right|\le\varepsilon_j^{(i)} \\ j=1,..,k;i=1,...,N_j\end{array}\right\} \tag{1}$$

where $N=N_1+...+N_k$ ($k,N_1,...,N_k$ - positive integers), $(l^{(N)},\varphi_N)$ couple , D_N given set of such pairs of N Information functionals $l^{(N)}=(l_1^{(1)},...,l_1^{(N_1)},...,l_k^{(1)},...,l_k^{(N_k)})$ algorithm and processing of inaccurate information $\varphi_N(z_1^{(1)},...,z_1^{(N_1)},...,z_k^{(1)},...,z_k^{(N_k)};\cdot)$ to function that depends on the same variable as the approximating operators Tf (for further details, see (1)).

Large number of papers on this topic made by J.F.Traub, H. Wozniakowski, L. Plaskota (see (2,3)), And their collaborators and followers, where the research center tasked with minimizing the total *value* for finding approximate values of $z_j^{(i)}$ (the information 'noise') in (1). At the same time great attention is paid to the relationships between the different specification of the general problem of recovering (1).

Another direction of research in the works of M. Tikhomirov G.G. Magaril-Iliyaev, K.Yu. Osipenko and A.G. Marchuk (see, for example., (4))), where are *exact* solution of the problem (1).

Finally, the approach to the problem of optimal recovery of inaccurate information, structured as a 'Computer (computing) diameter', is the sequential execution of three operations (see, for example., (1) and (5) and the references therein Bibliography.) :

$1^0.\asymp\ \delta_N(0)$; 2^0. Located $\{\tilde{\varepsilon}_N\}$ such that $\delta_N(0)\asymp\delta_N(\tilde{\varepsilon}_N)$, while taking $3^0.\ \forall\eta_N\uparrow+\infty$: $\overline{\lim\limits_{N\to+\infty}}\frac{\delta_N(\tilde{\varepsilon}_N\eta_N)}{\delta_N(\tilde{\varepsilon}_N)}=+\infty$.

References

(1) Temirgaliev N. // Vest.ENU im. L.N.Gumileva, 2010. Spets. vypusk, posvyashchennyi nauchnym dostizheniyam matematikov ENU im. L.N.Gumileva, str. 1-194.
(2) Plaskota 'Noisy information and computational complexity'; Cambridge University Press, 1996.
(3) E. Novak, H. Wozniakowski, Tractability of multivariate problems. Volume I: Linear information. European Mathematical Society, 2008.
(4) G.G. Magaril-Il'yaev, K.Yu. Osipenko, V.M. Tikhomirov, 'Nyeopredelennost' znaniya ob'obekte i tochnost' metodov yego vosstanovleniya', *Probl. peredachi inform.*, **39**:1 2003, 118–133
(5) Sh.K.Abikenova, N.Temirgaliev, On the sharp order of informativeness of all possible linear functionals in the discretization of solutions of the wave equations // Differential Equation, 2010, vol. 46, No 8, pp. 1201-1204.