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Best approximation with approximations nonlinear in a few variables. (English)

Zbl 0778.41011

[For the entire collection see Zbl 0745.00025.]

The paper presents a review of results of 63 works published mainly in 1966-1991. It is considered the best approximation of functions by the approximating function $F$ with vector parameters when $F$ is linear with respect to large number of variables and is nonlinear with respect to the remaining variables.

The linear problem and the problem of uniform (Chebyshev) approximation are well studied. The difficulties of nonlinear approximation are noted: non-existence of best approximating element, problems of degeneration and so on.

The results on discrete approximation by exponential-polynomial sums are discussed, i.e. when the role of approximating apparatus is played by the sum of polynomial and exponential part. In particular there are cited the works on uniform approximation on finite interval by exponential- polynomial sums. It is considered the uniform powered rational approximation by functions of the form $P^S/q^V$, $q > 0$, $S$ and $V$ are natural. The questions of discrete approximation in $L_1$ and $L_2$ by rational and exponential-polynomial sums are discussed. 6 applications are given, such as mathematical theory of behaviour of the Discrete Remez Algorithm, differential Equation Approach etc. complementing the general topic of review.

Reviewer: M.B.A.Babaev (Baku)

MSC:

41A50  Best approximation, Chebyshev systems

Keywords:
discrete Remez algorithm; discrete approximation; exponential-polynomial sums