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On weak coercivity for a system of differential operators in the isotropic Sobolev space

It is known that an elliptic system $\{P_j(x,D)\}_1^N$ of order l is weakly coercive in $\overset{\circ}{W}{}^l_\infty(\mathbb{R}^n)$, that is, all differential monomials of order $\le l-1$ on $C_0^\infty(\mathbb{R}^n)$-functions are subordinated to this system in the L^∞-norm. Conditions for the converse result are found and other properties of weakly coercive systems are investigated.

An analogue of the de Leeuw-Mirkil theorem is obtained for operators with variable coefficients: it is shown that an operator $P(x,D)$ in $n \ge 3$ variables with constant principal part is weakly coercive in $\overset{\circ}{W}{}^l_\infty(\mathbb{R}^n)$ if and only if it is elliptic. A similar result is obtained for systems $\{P_j(x,D)\}_1^N$ with constant coefficients under the condition $n \ge 2N+1$ and with several restrictions on the symbols $P_j(\xi)$.

A complete description of differential polynomials in two variables which are weakly coercive in $\overset{\circ}{W}{}^l_\infty(\mathbb{R}^2)$ is given. Wide classes of systems with constant coefficients which are weakly coercive in $\overset{\circ}{W}{}^l_\infty(\mathbb{R}^n)$, but non-elliptic are constructed.

This communication is based on the joint work [1] with M.M. Malamud.

[1] Limanskii D.V., Malamud M.M. // Mat. Sb. — 2008. — **199**, N 11, 75-112.