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## **On the recent results in the theory of operators in general Morrey-type spaces**

The theory of boundedness of classical operators of real analysis, such as maximal operator, fractional maximal operator, Riesz potential, singular integral operator etc, from one weighted Lebesgue space to another one is by now well studied. For the overwhelming majority of the values of the numerical parameters necessary and sufficient conditions on the weight functions ensuring boundedness have been found.

These results have good applications in the theory of partial differential equations. However, it should be noted that in the theory of partial differential equations, alongside with weighted Lebesgue spaces, general Morrey-type spaces also play an important role, but until recently there were no results, containing necessary and sufficient conditions on the weight functions ensuring boundedness of the aforementioned operators from one general Morrey-type space to another one (apart from the cases in which this follows directly from the appropriate results for weighted Lebesgue spaces). The case of power-type weights was well studied, but for general Morrey-type spaces only sufficient conditions were known.

In the last decade necessary and sufficient conditions for the case of general Morrey-type spaces have been found, but for a comparatively restricted range of the numerical parameters. In this area there are many open questions which may be of particular interest to experts in studying such problems for weighted Lebesgue spaces.

In the talk a survey of results, containing necessary and sufficient conditions for boundedness of main operators of real analysis, will be given, and open problems will be discussed in detail. The talk is based on the results in this area, obtained together with my numerous co-authors from many countries: Algeria (M.A. Senouci), Antigua and Barbuda (D.J. Joseph), Azerbaijan (H. Guliyev, V. Guliyev, R. Mustafaev), Georgia/Czech Republic (A. Gogatishvili), India (P. Jain), Indonesia (D. Hakim), Iran (A. Ghorbanalizadeh), Israel (E. Liflyand), Italy (P.D. Lamberti, M. Lanza de Cristoforis), Japan (E. Nakai, Y. Sawano, T. Sobukawa), Kazakhstan (N. Bokayev, D. Chigambaeva (D. Darbayeva), N. Kydyrmina, D. Matin, E. Nursultanov, R. Oinarov), Russia (M.L. Goldman, T.R. Khairullin, T.V. Tararykova), Turkey (A. Serbetci).