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Title: On regularity properties of $p(x)$-harmonic functions

Abstract: This talk is based on the joint work with Yurij Alkhutov (Vladimir State University). I shall present a number of results concerning regularity properties of solutions to the $p(x)$-Laplace equation

$$\text{div} \left( |\nabla u|^{p(x)} \nabla u \right) = 0.$$ 

While the most widespread condition is the log-Hölder continuity of the variable exponent $p(\cdot)$ we are interested in what can be obtained under more relaxed assumptions. First, we study cases when the exponent $p(\cdot)$ is discontinuous but enjoys clear geometric structure. Second, we work with the modulus of continuity worse than log-Hölder. Of special interest is when $p(\cdot)$ is regular only at one point.