Monday's Nonstandard Seminar 2020/21 (9)
30 November 2020, 14:00 CET (= 22:00 in Japan)

title: "Boundary regularity of minimizers of double phase functionals"

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This talk is concerned with the boundary regularity for minimizers of functionals of double phase with variable exponents:

$$\int_\Omega \left(|Du|_g^{p(x)} + a(x)|Du|_g^{q(x)}\right) dx,$$

where $\Omega \in \mathbb{R}^m$ is a bounded domain with sufficiently smooth boundary $\partial\Omega$, $a(\cdot), p(\cdot), q(\cdot)$ are functions satisfying the following conditions:

- $a(\cdot) \geq 0, \ \ a(\cdot) \in C^{0,\alpha}(\overline{\Omega})$,
- $p(\cdot), q(\cdot) \in C^{0,\sigma}(\overline{\Omega})$,
- $1 < p(x) \leq q(x) \ \forall x \in \Omega, \ \ \sup_\Omega(q(x) - p(x)) < \min\{\alpha, \sigma\}$,

and

$$|\xi|_g := (\delta_{ij} g^{\alpha\beta}(x) \xi^i_\alpha \xi^j_\beta)^{1/2}$$

for a positive definite matrix $g(\cdot) = (g^{\alpha\beta}(\cdot))$ with continuous $g^{\alpha\beta}(\cdot)$.

We prove the following results ([1]): The minimizer of the above functional with suitable Dirichlet boundary condition is Hölder continuous up to the boundary. When g is Hölder continuous, we see also that Du is locally Hölder continuous.

[1] A.Tachikawa, *Boundary regularity of minimizers of double phase functionals,* (to appear in JMAA, special issue "New Developments in Non-uniformly Elliptic and Nonstandard Growth Problems") doi.org/10.1016/j.jmaa.2020.123946