

*Department of Mathematics,  
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# Math 248 - Analysis Seminar

**Prof. Jonas Hirsch**

University of Leipzig

## On bounded solutions of linear elliptic operators with measurable coefficients - De Giorgis theorem revisited

### Abstract:

We consider the classical framework of the famous De-Giorgi-Nash-Moser theorem:  $\operatorname{div}(A(x)\nabla u) = f$ , where  $A(x)$  is a symmetric, elliptic matrix field,  $f$  is given and  $u : U \subset \mathbb{R}^n \rightarrow \mathbb{R}$  is the unknown. N. Trudinger was the first one to relax the assumptions on the coefficients matrix  $A(x)$ . He was able to derive boundedness results if the matrix is barely integrable in the right spaces. In particular he was able to show that if  $\lambda(x)|\xi|^2 \leq \xi \cdot A(x)\xi \leq \Lambda(x)|\xi|^2$ ,  $\forall x$  and the  $\lambda^{-1} \in L^p, \Lambda \in L^q$  satisfying  $\frac{1}{p} + \frac{1}{q} < \frac{2}{n}$ . The integrability condition had been considerably improved by P. Bella and M. Schaffner in the framework of the Moser-iteration to  $\frac{1}{p} + \frac{1}{q} < \frac{2}{n-1}$ . A counterexample had been constructed by Franchi, Serapioni, and Serra Cassano under  $\frac{1}{p} + \frac{1}{q} > \frac{2}{n}$ . The aim of this talk is to revisit De Giorgis original approach having in mind the question concerning the optimal integrability assumption on the coefficient field. We will present how this question is surprisingly linked to a question in linear programming with an infinite horizon.

This talk will be about my ongoing project with M. Schaffner, hence about work in progress.

**Tuesday, October 26, 2021**

**11:00 AM**

**<https://ucsd.zoom.us/j/99515535778>**

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