



DEPARTAMENTO  
DE ANÁLISIS  
MATEMÁTICO Y  
MATEMÁTICA  
APLICADA



## SEMINARIO DE ANÁLISIS MATEMÁTICO Y MATEMÁTICA APLICADA

**Mauro Sanchiz**  
**UCM**

# Prelectura de Tesis Doctoral: Structure and operators on variable Lebesgue spaces

Variable exponent Lebesgue spaces  $L^{p(\cdot)}(\Omega)$  are a generalization of classical Lebesgue spaces, and a particular example of Banach function spaces and Musielak-Orlicz spaces. They have seen a strong renewed relevance in the last decades, due to their applications to harmonic analysis and related differential equations and applications. In this PhD prelecture, we get an overview of several different topics in  $L^{p(\cdot)}(\Omega)$  spaces related with its structure and the inclusion operators between them. In particular showing our results and characterizations of weakly compact subsets and of several properties for the inclusion operator  $L^{p(\cdot)}(\Omega) \rightarrow L^{q(\cdot)}(\Omega)$ . This includes the study of Nakano sequence spaces  $\ell^{p_n}$ . Also, an isometry between the variable exponent Lebesgue spaces  $L^{p(\cdot)}(0, \infty)$  and  $L^{q(\cdot)}(0, 1)$  for a particular  $q(\cdot)$  is stated, property that is shared by classical  $L^p$  spaces, but not by Banach function spaces in general, as Orlicz spaces  $L^\varphi$ . Finally, we comment a few results on compact inclusions between variable order Holder spaces, product of a short research stay of 3 months in Warsaw, Poland with Professor Przemyslaw Gorka.

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**a las 13:00 horas**  
**Lugar: Aula Alberto Dou (209)**  
**Facultad de CC Matemáticas, UCM**