

# Sobolev embeddings of $G$ -symmetric functions and applications

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Let  $N > kp$ ,  $B \subset \mathbb{R}^N$  be the open unit ball centered at zero and let  $G$  be a closed connected subgroup of  $SO(N)$ . Consider the Sobolev space of  $G$ -symmetric functions

$$W_G^{k,p}(B) = \{u \in W^{k,p}(B); u \circ g = u \text{ for all } g \in G\}.$$

In this talk I will prove some new embeddings of the type  $W_G^{k,p}(B) \hookrightarrow L^q(B, |x|^\alpha)$ , with  $q$  higher than the classical critical Sobolev exponent  $\frac{pN}{N-kp}$ . For each  $x \in S^{N-1}$  denote by  $d(xG)$  the dimension of the orbit  $xG$ .

- I will stress the role played in these embeddings by the minimal dimension

$$d_G = \min_{x \in S^{N-1}} d(xG).$$

- Prove the symmetry breaking for  $G$ -symmetric groundstate solutions of the Hénon equation.
- Show that  $G$ -symmetric ground state solutions of the Hénon equation concentrates and blow up around  $G$ -minimal orbits.