REGULARITY OF SEMI-STABLE SOLUTIONS OF A GENERALIZED HARDY-HENON EQUATION ON THE BALL

J. SILVERIO MARTÍNEZ-BAENA AND SALVADOR VILLEGAS

ABSTRACT. In this seminar we will study the optimal regularity of semi-stable radially symmetric solutions $u \in H^1(B_1)$ of what we called general Hardy-Henon equation, $-\Delta u = |x|^\alpha f(u)$ in $B_1 \setminus \{0\}$, where $f \in C^1(\mathbb{R})$ is a general nonlinearity, $\alpha > -2$ and B_1 is the unit ball of $\mathbb{R}^N$, $N > 1$. We establish the boundedness of such solutions for dimensions $2 \leq N < 10 + 4\alpha$ and sharp pointwise estimates in the case $N \geq 10 + 4\alpha$. In addition, according to the relevant range of dimensions, we provide a large family of semi-stable radially decreasing unbounded $H^1(B_1)$ solutions.

Finally we will see the difficulties that arise when one try to extend the results to the non radial case.

J. SILVERIO MARTÍNEZ-BAENA[1] — DEPARTAMENTO DE ANÁLISIS MATEMÁTICO, UNIVERSIDAD DE GRANADA, 18071 GRANADA, SPAIN.
Email address: jsilverio@ugr.es

SALVADOR VILLEGAS[2] — DEPARTAMENTO DE ANÁLISIS MATEMÁTICO, UNIVERSIDAD DE GRANADA, 18071 GRANADA, SPAIN.
Email address: svillega@ugr.es

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