

ON A CLASS OF NONLINEAR ELLIPTIC EQUATIONS WITH FAST INCREASING WEIGHT AND CRITICAL GROWTH

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We are concerned with the existence of rapidly decaying solutions for the equation

$$-\operatorname{div}(K(x)\nabla u) = \lambda K(x)|x|^\beta |u|^{q-2}u + K(x)|u|^{2^*-2}u, \quad x \in \mathbb{R}^N,$$

where $N \geq 3$, $2 \leq q < 2^* := 2N/(N-2)$, $\lambda > 0$ is a parameter, $K(x) := \exp(|x|^\alpha/4)$, $\alpha \geq 2$ and the number β is given by $\beta := (\alpha - 2)\frac{(2^*-q)}{(2^*-2)}$. We study existence, non-existence and multiplicity of solution (positive or nodal) depending on the range of the parameters λ and q . The obtained solutions are related with self-similar solutions of a nonlinear heat equation. The results presented are obtained in a jointly work with O. Myiagaki and J.P.P. da Silva and complement some recent results of F. Catrina, M. Furtado and M. Montenegro.

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