

SEMINÁRIOS DE ANÁLISE

Extremal curves for existence of positive solutions for multi-parameter elliptic systems in \mathbb{R}^N

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Abstract. This talk is concerned with the study of existence of extremal curves with respect to the parameters $\lambda, \mu \geq 0$ for existence and multiplicity of $D^{1,2}(\mathbb{R}^N)$ -solutions for the multi-parameter elliptic system

$$\begin{cases} -\Delta u = \lambda w(x) f_1(u) g_1(v) \text{ in } \mathbb{R}^N, \\ -\Delta v = \mu w(x) f_2(v) g_2(u) \text{ in } \mathbb{R}^N, \\ u, v > 0 \text{ in } \mathbb{R}^N \text{ and } u(x), v(x) \xrightarrow{|x| \rightarrow \infty} 0, \end{cases}$$

where $f_i, g_i \in C(\mathbb{R}, (0, \infty))$ ($i = 1, 2$) satisfy some technical conditions, w is a vanishing positive potential at infinity and $N \geq 3$. The principal difficulties in approaching our problem come from the fact that it may not have the variational structure and the construction of an associated compact operator. By introducing appropriated functions spaces, we are able to prove our principal results by using topological arguments.