



Mês de: **Julho 2009**

SEMINÁRIO DE ANÁLISE E EQUAÇÕES DIFERENCIAIS

Dia 9 de Julho (quinta-feira), às 14h, na Sala B3-01

“Homogenization of spectral problem
for elliptic operator with sign-changing weight function”

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Abstract. The talk will focus on the asymptotic behaviour of spectrum of the eigenvalue problem

$$\operatorname{div}\left(a\left(\frac{x}{\varepsilon}\right)\nabla u\right)=\lambda\rho\left(\frac{x}{\varepsilon}\right)u, \quad u \in H_0^1(Q)$$

stated in a regular bounded domain $Q \subset \mathbb{R}^n$. It is supposed that the coefficients $a(y)$ and the weight function $\rho(y)$ are periodic and that $a(y)$ satisfies the uniform ellipticity conditions. The crucial assumption which makes this spectral problem non-standard, is that the weight function $\rho(y)$ changes sign. Under this assumption that we show that for any $\varepsilon > 0$ the positive and negative eigenvalues form the infinite series

$$\lambda_1^{\varepsilon,+} \leq \lambda_2^{\varepsilon,+}, \dots, \leq \lambda_j^{\varepsilon,+}, \dots \rightarrow +\infty$$

and

$$\lambda_1^{\varepsilon,-} \geq \lambda_2^{\varepsilon,-}, \dots, \geq \lambda_j^{\varepsilon,-}, \dots \rightarrow -\infty,$$

and study the asymptotic behaviour of the eigenpairs, as $\varepsilon \rightarrow 0$. In particular, we will show that the limit behaviour of spectrum depends crucially on whether the mean value of ρ is greater than zero or equal to zero, or less than zero.

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