

SEMINAR

Grupo de Análise Funcional e Aplicações Functional Analysis and Applications Group

Positive solutions for some boundary-value problems with sign changing green's functions

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Abstract

After a brief review on the connection between the existence positive solutions for some second and fourth order boundary value problems and the positivity of the associated Green's functions, we analyse some possibilities of finding positive solutions for second order problems with Dirichlet and periodic boundary conditions, for which the correspondent Green's functions change sign. We consider the second order Hill's operator

$$L[a]u(t) \equiv u''(t) + a(t)u(t), \quad t \in [0, T] \equiv I,$$

where $a: I \rightarrow \mathbb{R}$, $a \in L^\alpha(I)$, $\alpha \geq 1$. We give special attention to the particular case of the constant potential $a(t) = \rho^2$, and use this operator to prove existence of positive solution for some fourth order bvp's where the correspondent linear operator can be decomposed into two second order operators with sign-changing Green's functions.

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