

Operator Theory and Analytic Function Spaces

Basis properties of generalised p -cosine functions

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Consider a periodic function F , such that its restriction to the unit segment lies in the Banach space $L_s = L_s(0, 1)$ for $s > 1$. Denote by S the family of dilations $F(nx)$ for all n positive integer. The purpose of this talk is to discuss the following question: When does S form a Schauder basis of L_s ?

At first sight, one might think that this question has been studied considerably in the past. For instance in the context of Paley-Wiener-type theorems. As it turns, this has not been the case, and the latter does not seem to be of much use in this respect.

We will formulate general criteria which apply to the particular case of F being the p -sine and the p -cosine functions. Both these functions arise naturally in the context of the non-linear eigenvalue problem associated to the one-dimensional p -Laplacian in the unit segment. Our main goal will be to determine a range of values for the parameter p , such that the dilated p -cosine functions form a Schauder basis of L_s . Our results improve upon those from [Edmunds, Gurka, Lang, *J. Math. Anal. Appl.* 420 (2014)].