Dedication

To my family

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Abstract

We study vector measure. Integration and spaces of p-integrable functions with respect to a vector measure are considered .We establish the spaces of integrable and vector functions with respect to vector measures of convex range and factorization of operators from L^p - spaces. We show some integral identities and inequalities for entire functions and their applications to the coherent state transform, with positive multilinear operators acting on weighted L^p - spaces. We construct the structures of the modulation spaces and multilinear pseudo-differential operators. We show the localization operators and the time-frequency analysis of Sjostrand's class. We study the necessary conditions for Schatten class localization operators and tensor product representations of L^p - space of vector measure duality. We investigate the vector measure Maurey – Rosenthal – type factorizations and sums of L^p - spaces. We show the structure of the short – time Fourier transform analysis of localization operators and study the compactness criteria in function spaces and time-frequency localization operators on Hilbert spaces.

الخلاصة

تمت دراسة قياس المتجه . تم اعتبار تكامل وفضاءات دوال تكامل p – بالنسبة الى قياس المتجه . تم تأسيس الفضاءات ال قابلة للتكامل ودوال المتجه بالنسبة الى فضاءات المتجه من المدى المحدب وتحليل عوامل المؤثرات من فضاءات L^p – . تم توضيح بعض متطاب قات التكامل والمتباينات لاجل الدوال التامة وتطبي قاتها الى تحويل حالة التماسك طب قا للمؤثرات متعددة الخطية الموجبة الفاعلة على فضاءات L^p – المرجحة . تم بناء تشييدات الفضاءات المعدلة والمؤثرات شبه التفاضلية متعددة الخطية . تم توضيح المؤثرات الموضعية وتحليل التردد- الزمن لعائلة سجوستراند . تمت دراسة الشروط الضرورية لاجل المؤثرات الموضعية لعائلة شاتن وتمثيلات ضرب تنسر لفضاءات L^p – لثنائيات قياس المتجه. تمت منا قشة قياسات متجه تحليلات عوامل نوع مايري – روسنثال ومجموعات فضاءات L^1 – .تم توضيح تشييد تحليل تحويل فوريير للزمن – ال قصير للمؤثرات الموضعية ودراسة معيار التراص فى فضاءات الدالة ومؤثرات موضعية التردد- الزمن على فضاءات هلبرت.

Introduction

Chapter 1 presents some basic facts about such measures, chiefly through the study of their p- semi variations. We give expressions for the norms of linear operators defined by vector measures. We consider the continuity properties of the p- semi variation, and define regularity in terms of the p- semi variation. The integration theory is developed although the integral is defined in terms of linear functions .The dominated convergence theorem is proven under the additional assumption that the limit function is integrable , and it is shown that this true whenever the range space of the measure is sequentially complete . Integral representations of weakly compact operators from $C(s), C_{\varphi}(\mathrm{T})$ and $C(\mathrm{T})\beta$ into locally convex, Hausderff space are given.

Chapter 2 shows that the algebraic theory of integration with respect to a semi variation is outlined. It is applied to the integration of vector-valued function with respect to vector- valued measure .We study the normed spaces of equivalence classes of Banach space - valued functions that are Dobrakov S^* or McShane integrable with respect to Banach space – valued measure, where the norm is the natural one given by the total semi variation of the indefinite integral . We show that simple functions are dense in these spaces. As a consequence we characterize when the corresponding indefinite integrals have norm relatively compact range .We also determine when these spaces are ultrabornological .We conclude the spaces of Birkhoff (respectively McShane) itegrable functions defined on complete (respectively quasi-Radon) probability spaces endowed with the Pettis norm , are ultrabornological .

Chapter 3 obtains sharp bounds for some associated operators and proving denseness of analytic polynomials in A^p for $1 \le p < \infty$ .We then apply the results to the coherent state transform , extending and simplifying some previous known results .For a σ -finite measure spaces and a class of nonnegative measureable functions given a positive multilinear operator mapping on this space , we consider the problem of determining those nonnegative functions on certain bound .In particular the modulation space $\mathrm{M}^{\infty,1}$ includes non-smooth symbols .Several multilinear Calder'on Vaillancourt-type theorems are then obtained by

using certain embeddings of classical function spaces into modulation spaces.

Chapter 4 shows that localization operators have been object of study in quantum mechanics, in PDE and signal analysis recently. In engineering, a natural language is given by time-frequency analysis .We shall present the theory of these operators developed so far. Namely, regularity properties, composition formulae and their multilinear extension shall be highlighted .Time –frequency analysis will provide tools, techniques, and function spaces. We shall use modulation spaces, which allow optimal results in terms of regularity properties for localization operators acting on $L^2(\mathbb{R}^d)$.

Chapter 5 shows that a sufficient condition for time-frequency localization operators belongs to the Schatten class is that the symbol of the operator belongs to the modulation space $M^{p,\infty}(\mathbb{R}^{2d})$ and the window functions to the modulation space M^1, here we show a partial converse . In this sense modulation spaces are optimal for the study of localization operators. The main ingredients are frame theory and Gabor frames. We identify the space of p-integrable functions with the dual of a certain space of operators under reasonable restrictions for the countably additive vector measure. We extending in this way the Maurey-Rosenthal theorem .We use this result to obtain information about the structure of $L^1(m)$ when m is a sequential vector space.

Chapter 6 performs a detailed study of the boundedness properties for localization operators .The language and the tools employed are provided by time-frequency analysis named short-time Fourier transform .Besides the necessary boundedness conditions are referred to a fixed pair of window functions so that we can claim the optimality of the results .The
classical criterion for compactness in Banach spaces of functions can be reformulated into a simple tightness condition in the time-frequency domain .This description preserves more explicitly the symmetry between time and frequency than the classical conditions. The result is first stated and proved for $L^2(\mathbb{R}^d)$, and then generalized to coorbit spaces .We consider localization operators on $L^2(\mathbb{R}^d)$ defined by symbols in a subclass of $M^\infty(\mathbb{R}^{2d})$.

The contents