cases	doc_1		doc_2		decision	id
			authors	• Victor Nistor • Evgenij Troitsky	DUPLICATES	335
	authors	• Victor Nistor • Evgenij Troitsky	**title**	An index for gauge-invariant operators and the Dixmier-Douady invariant		
	title	An index for gauge-invariant operators and the Dixmier-Douady invariant	**publication_date**	2002-02-18 00:00:00		
	publication_date	2003-08-25 00:00:00	**source**	SupportedSources.INTERNET_ARCHIVE		
	source	SupportedSources.INTERNET_ARCHIVE	**journal**			
	journal	American Mathematical Society (AMS)	**volume**			
	volume		**doi**			
	doi	10.1090/s0002-9947-03-03370-1	**urls**	• https://archive.org/download/arxiv-math0201207/math0201207.pdf		
	urls	• https://web.archive.org/web/20200812015804/https://www.ams.org/journals/tran/2004-356-01/S0002-9947-03-03370-1/S0002-9947-03-03370-1.pdf	**id**	id6554075409947381691		
	id	id-2702760828692143107	**abstract**	Let â†’ B be a bundle of compact Lie groups acting on a fiber bundle Y â†’ B. In this paper we introduce and study gauge-equivariant K-theory groups K_^i(Y). These groups satisfy the usual properties of the equivariant K-theory groups, but also some new phenomena arise due to the topological non-triviality of the bundle â†’ B. As an application, we define a gauge-equivariant index for a family of elliptic operators (P_b)_b â^^ B invariant with respect to the action of â†’ B, which, in this approach, is an element of K_^0(B). We then give another definition of the gauge-equivariant index as an element of K_0(C^*()), the K-theory group of the Banach algebra C^*(). We prove that K_0(C^*()) â‰ƒ K^0_() and that the two definitions of the gauge-equivariant index are equivalent. The algebra C^*() is the algebra of continuous sections of a certain field of C^*-algebras with non-trivial Dixmier-Douady invariant. The gauge-equivariant K-theory groups are thus examples of twisted K-theory groups, which have recently proved themselves useful in the study of Ramond-Ramond fields.		
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