Summaray.

The problem of describing maps on operators and matrices that preserve certain functions, subsets and relations has been widely studied in the literature, see [7], [9], [10], [11], [14], [15], [16], [17], [23], [29], [30], [32], [33] and their references therein. One of the classical problems in this area of research is to characterize maps preserving the spectra of the product of operators. Moln´ar in [29] studied maps preserving the spectrum of operator and matrix products. His results have been extended in several directions [8], [1], [2], [12], [13], [19], [21], [22], [24] and [25]. In [2], the problem of characterizing maps between matrix algebras preserving the spectrum of polynomial products of matrices is considered. In particular, the results obtained therein extend and unify several results obtained in [11] and [13].

Let H and K be two complex infinite dimensional Hilbert spaces. Let B(H) (resp. B(K)) denote the algebra of all bounded linear operators on H (resp. on K). We say that a map φ : B(H) → B(K) preserves the skew Lie product of operators if $[\varphi(T), \varphi(S)]_* = [T, S]_*$,where $[T,S]_* = TS - ST^*$, for any operators S, T ∈ B(H). The plan is as follows:

(1) Some of the basic definitions and terminology used in this thesis are introduced in Chapter 2.

(2) In Chapter 3, maps preserving peripheral spectrum of Jordan products of self-adjoint operators are discussed.

(3) In the last chapter, we deal with the problem of characterizing surjective maps φ : B(H) → B(K) preserves the skew Lie product of operators.

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