

INSALATE DI MATEMATICA



Introduction to hypercomplex analysis and spectral theory in noncommutative settings

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IN THIS TALK

Spectral theory is a fundamental topic in analysis for its applications to quantum mechanics and in the construction of different functional calculi for linear operators. A quaternionic generalization of this theory could be crucial for the quaternionic formulation of quantum mechanics and for studying vector operators, however, the classic spectral theory is not suitable for this noncommutative setting and finding a new definition of spectrum is not a straightforward problem. In this talk, we will explore the main points of classic spectral theory and, using some tools from hypercomplex analysis, we will provide a novel notion of spectrum applicable not only to the quaternionic case, but also to more general noncommutative environments. Then we will discuss associated functional calculi and illustrate the theory's utility through concrete examples of vector operators.

 **words: Spectral theory, functional calculus,
hypercomplex analysis**