

HARMONIC AND SPECTRAL ANALYSIS

International Zoom Conference

May 31 – June 2, 2021

Semi-Fredholm operators on Hilbert C^* -modules

STEFAN IVKOVIĆ

The Mathematical institute of the Serbian Academy of Sciences and Arts

Belgrade
Serbia

Based on the definition of C^* -Fredholm operator on the standard module given by Mishchenko and Fomenko we define semi- C^* -Fredholm operators and semi- C^* -Weyl operators on Hilbert C^* -modules. We provide generalization in this context of various results from the classical semi-Fredholm theory. For instance we prove that these new classes of operators and their various subclasses are open in the norm topology, closed under multiplication, invariant under compact perturbations and many other results generalizing their classical counterparts. Both adjointable and non-adjointable operators are considered. In the special case of operators over W^* -algebras we obtain also generalization of Schechter-Lebow characterization and punctured neighbourhood theorem. Moreover, by considering exact sequences of regular operators we obtain generalization in the setting of operators over C^* -algebras of the results by Djorjević on generalized Weyl operators, of index theorem etc. Finally, we consider upper triangular 2 by 2 operator matrices over C^* -algebras and describe the relationship of semi- C^* -Fredholmness of these matrices and their diagonal entries. However, the main topic of this lecture will be generalized spectral semi-Fredholm theory in the setting of new spectra in C^* -algebras. This is a continuation of the lecture from previous year on the conference „Harmonic and Spectral Analysis“, when the generalized spectra in C^* -algebra of operators on Hilbert C^* -modules were introduced and the description of such spectra of shift operators, unitary, self-adjoint and normal operators on the standard C^* -module has been given. Various subclasses of semi- C^* -Fredholm operators induce different generalized spectra in C^* -algebras of operators on Hilbert C^* -modules. On this lecture we will provide generalizations in this setting of the results from the classical spectral semi-Fredholm theory.