The Index Theory Associated to a Non-Finite Trace on a $C^*$-Algebra

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Abstract. The index theory considered in this paper, a generalisation of the classical Fredholm index theory, is obtained in terms of a non-finite trace on a unital $C^*$-algebra. We relate it to the index theory of M. Breuer, which is developed in a von Neumann algebra setting, by means of a representation theorem. We show how our new index theory can be used to obtain an index theorem for Toeplitz operators on the compact group $U(2)$, where the classical index theory does not give any interesting result.