Meeting: 999, Nashville, Tennessee, SS 1A, Special Session on Von Neumann Algebras and Noncommutative Ergodic Theory

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Non-commutative, analytic version of Hilbert's 17-th problem in type II_1 von Neumann algebras.

We prove a non-commutative version of the Hilbert's 17th problem, giving a characterization of the class of non-commutative polynomials in n-undeterminates that have positive trace when evaluated in n-selfadjoint elements in arbitrary II1 von Neumann algebra. As a corollary we prove that Connes's embedding conjecture is equivalent to a statement that can be formulated entirely in the context of finite matrices. (Received August 22, 2004)