

ON THE CONNES EMBEDDING CONJECTURE

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We review different equivalent conditions for the Connes Embedding Conjecture. In particular we present 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 III₁ 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.