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KMS states of the C^ -algebras of quasi-lattice ordered semigroups*

Homomorphisms of the quasi-lattice ordered semigroups introduced by Nica into the positive real numbers give rise to quasi-periodic time evolutions on the associated C^* -algebras, and we study the equilibrium states of the resulting C^* -dynamical systems. We show that equilibrium is unique at each inverse temperature but there is a critical inverse temperature at which the von Neumann type of the equilibrium states changes. We also establish a connection with current work on monoid growth, and offer an operator-algebraic motivation for recent inversion formulas, due to Albenque-Nadeu, Saito and McMullen, for the growth function of a monoid in terms of its clique polynomial. This is joint work with C. Bruce (Victoria), J. Ramagge (Sydney) and A. Sims (Wollongong).