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Partition functions as C-dynamical invariants and actions of congruence monoids*

C*-algebras of $ax + b$ -semigroups of congruence monoids $C_\lambda^*(R \rtimes R_{m,\Gamma})$ are introduced by C. Bruce, which behaves similarly to the C*-algebras examined by Cuntz–Deninger–Laca. Both kinds of algebras have canonical time evolutions, and have similar phase transition phenomena. In this talk, we determine the partition functions and associated representations of $(C_\lambda^*(R \rtimes R_{m,\Gamma}), \sigma)$, inspired by the construction of the representations of Cuntz–Deninger–Laca. As a consequence, we recover several number theoretic invariants from those C*-dynamical systems. In the case of $(C_\lambda^*(R \rtimes R^\times), \sigma)$, we in fact obtain slightly different partition functions from those suggested in the work of Cuntz–Deninger–Laca. This is a joint work with C. Bruce and M. Laca.