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Título: Zeta Functions For Two-Dimensional Shifts Of Finite Type

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This work is concerned with zeta functions of two-dimensional shifts of finite type. A two-dimensional zeta function $\zeta_0(s)$, which generalizes the Artin-Mazur zeta function, was given by Lind for \mathbb{Z}^2 -action σ . In this paper, the n th-order zeta function ζ_n of σ on $\mathbb{Z}^{n \times 8}$, $n=1$, is studied first. The trace operator T_n , which is the transition matrix for x -periodic patterns with period n and height 2, is rotationally symmetric. The rotational symmetry of T_n induces the reduced trace operator t_n and $\zeta_n = (\det(I - s t_n))^{-1}$.

The zeta function $\zeta_n = \prod_{k=1}^{\infty} (\det(I - s t_n))^{-1}$ in the x -direction is now a reciprocal of an infinite product of polynomials. The zeta function can be presented in the y -direction and in the coordinates of any unimodular transformation in $GL_2(\mathbb{Z})$. Therefore, there exists a family of zeta functions that are meromorphic extensions of the same analytic function $\zeta_0(s)$. The natural boundary of zeta functions is studied. The Taylor series for these zeta functions at the origin are equal with integer coefficients, yielding a family of identities, which are of interest in number theory. The method applies to thermodynamic zeta functions for the Ising model with finite range interactions.

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