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An Alternative Proof for the Topological Entropy of the Motzkin Shift

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Abstract : A Motzkin shift is a mathematical model for constraints on genetic sequences. In terms of the theory of symbolic dynamics, the Motzkin shift is nonsofic, and therefore, we cannot use the Perron-Frobenius theory to calculate its topological entropy. The Motzkin shift M(M,N) which comes from language theory, is defined to be the shift system over an alphabet A that consists of N negative symbols, N positive symbols and M neutral symbols. For an x in the full shift AZ, x is in M(M,N) if and only if every finite block appearing in x has a non-zero reduced form. Therefore, the constraint for x cannot be bounded in length. K. Inoue has shown that the entropy of the Motzkin shift M(M,N) is log(M + N + 1). In this paper, we find a new method of calculating the topological entropy of the Motzkin shift M(M,N) without any measure theoretical discussion.

Keywords : entropy, Motzkin shift, mathematical model, theory
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