Computability of Countable Subshifts in One Dimension

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Abstract

We investigate the computability of countable subshifts in one dimension, and their members. Subshifts of Cantor-Bendixson rank two contain only eventually periodic elements. Any rank two subshift in $2^{\mathbb{Z}}$ is is decidable. Subshifts of rank three may contain members of arbitrary Turing degree. In contrast, effectively closed (Π^0_1) subshifts of rank three contain only computable elements, but Π^0_1 subshifts of rank four may contain members of arbitrary Δ^0_2 degree. There is no subshift of rank $\omega + 1$.