

Toeplitz Matrices, Palindromes and Spin Systems

ABSTRACT. To any bitstream a_0, a_1, a_2, \dots of 0's and 1's there corresponds a sequence A_0, A_1, A_2, \dots of Toeplitz matrices

$$A_n = \begin{bmatrix} a_0 & a_1 & a_2 & a_3 & \dots & a_{n-1} \\ a_1 & a_0 & a_1 & a_2 & \dots & a_{n-2} \\ a_2 & a_1 & a_0 & a_1 & \dots & a_{n-3} \\ \vdots & \vdots & \vdots & \vdots & \ddots & \vdots \\ \vdots & \vdots & \vdots & \vdots & \ddots & \vdots \\ a_{n-1} & a_{n-2} & a_{n-3} & \dots & \dots & a_0. \end{bmatrix}$$

Using machinery from the study of operator algebras of spin systems some properties have been discovered about the nullity and kernels of the sequence of Toeplitz matrices. In turn this information provides insight into the equivalence classes of binary shifts on spin systems.