1135-05-1082 **Franklin H. J. Kenter*** (kenter@usna.edu) and **Jephian C.-H. Lin**. *On the error of a priori sampling: zero forcing sets and propagation time.*

Zero forcing is an iterative process on a graph used to bound the maximum nullity. The process begins with some colored, and the other vertices can become colored under a specific color change rule. The goal is to find a minimum set of vertices such that after iteratively applying the rule, all of the vertices become colored. Of particular interest is the propagation time of a chosen set which is the number of steps the rule must be applied in order to color all the vertices of a graph.

We give a linear algebraic interpretation of zero forcing: Find a set of vertices S such that for any weighted adjacency matrix $\mathbf{A}$, whenever $\mathbf{Ax} = \mathbf{0}$, all of of $\mathbf{x}$ can be recovered using only the entries corresponding to S. Here, S must be chosen before $\mathbf{A}$ is known. In this light, any error in $\mathbf{x}_S$ effects the error of $\mathbf{s}$ exponentially in the propagation time. This error can be quantitatively measured using newly defined zero forcing-related parameters: the error polynomial vector and the variance polynomial vector. Hence, quality of two zero forcing sets can objectively be compared even if the sets have the same size and propagation time. Examples and constructions are given. (Received September 19, 2017)