

## Sequences of Integers with Three Missing Separations

Daphne Der-Fen Liu, Grant Robinson\*, California State University, Los Angeles

Let  $D$  be a set of positive integers. We will examine the maximum density  $\mu(D)$  of integral sequences in which the separation between any two terms does not fall in  $D$ . The sets  $D$  considered in this presentation are mainly of the form  $\{1, j, k\}$ . The closely related function  $\kappa(D)$ , the parameter involved in the “lonely runner conjecture,” is also investigated. Exact values of  $\kappa(D)$  and  $\mu(D)$  are found for many families of  $D = \{1, j, k\}$ . In particular, we prove that the boundary conditions in some earlier results of Haralambis [1977] are sharp. Consequently, our results declaim two conjectures of Carraher et al. [2016], and extend some findings of Haralambis [1972] and Gupta [2000].