Discrete Mathematics Seminar
Illinois State University

2:00–2:50 pm, November 11

Speaker: Amin Bahmanian, Illinois State University

Ryser’s Theorem for $\rho$-latin Rectangles

Let $L$ be an $n \times n$ array whose top left $r \times s$ subarray is filled with $k$ different symbols, each occurring at most once in each row and at most once in each column. We find necessary and sufficient conditions that ensure the remaining cells of $L$ can be filled such that each symbol occurs at most once in each row and at most once in each column, and each symbol occurs a prescribed number of times in $L$. The case where the prescribed number of times each symbol occurs is $n$ was solved by Ryser (Proc. Amer. Math. Soc. 2 (1951), 550–552), and the case $s = n$ was settled by Goldwasser et al. (J. Combin. Theory Ser. A 130 (2015), 26–41). Our technique leads to a very short proof of the latter.