

Abstract:

Herzog, Vladioiu, and Zheng posed the following question: Given a positive integer n , does there exist a partition \mathcal{P}_n of the non-empty subsets of $\{1, 2, \dots, n\}$ into intervals, so that $|B| \geq n/2$ for each interval $[A, B]$ in \mathcal{P}_n . Their motivation involves a 1982 conjecture of Richard Stanley concerning what is now called the Stanley depth of a module. We answer this question in the affirmative by first embedding it in a stronger result. We then provide two alternative proofs of this second result. The two proofs use entirely different methods and yield non-isomorphic partitions. This presentation will focus on the elegant combinatorial arguments for constructing the partitions and will be accessible to undergraduates.