Meeting: 998, Houston, Texas, SS 1A, Special Session on Graph Theory and Combinatorics

998-05-414 **Graham Brightwell**, **H. A. Kierstead*** (kierstead@asu.edu), **A. V. Kostochka** and **Peter Winkler**. *Dice, Elections and Domination.* Preliminary report.

The *voter dimension* of a tournament $T = (V, E)$ is the least integer k such that there exists a k-set $\Sigma = \{L_i : i \in [k]\}$ of linear orders $L_i = (V, >_i)$ on V satisfying $(x, y) \in E$ iff $|\{i \in [k] : x >_i y\}| > \frac{k}{2}$ for all pairs $\{x, y\} \subseteq V$. We show that the domination number of a tournament is bounded by a function of its voter dimension. We also show that there exist tournaments with voter dimension at most $6k \lg k$ that do not have a dominating set of size k, i.e., that satisfy property S_k. The *dice dimension* of a tournament $T = (V, E)$ is the least f such that each vertex $v \in V$ can be represented by a fair f-sided die D_v so that $(x, y) \in E$ iff $\Pr(D_x > D_y) > \frac{1}{2}$ for all pairs $\{x, y\} \subseteq V$. We bound the dice dimension of a tournament in terms of its voter dimension.

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