

# Diversity, Agreement, and Polarization in Elections

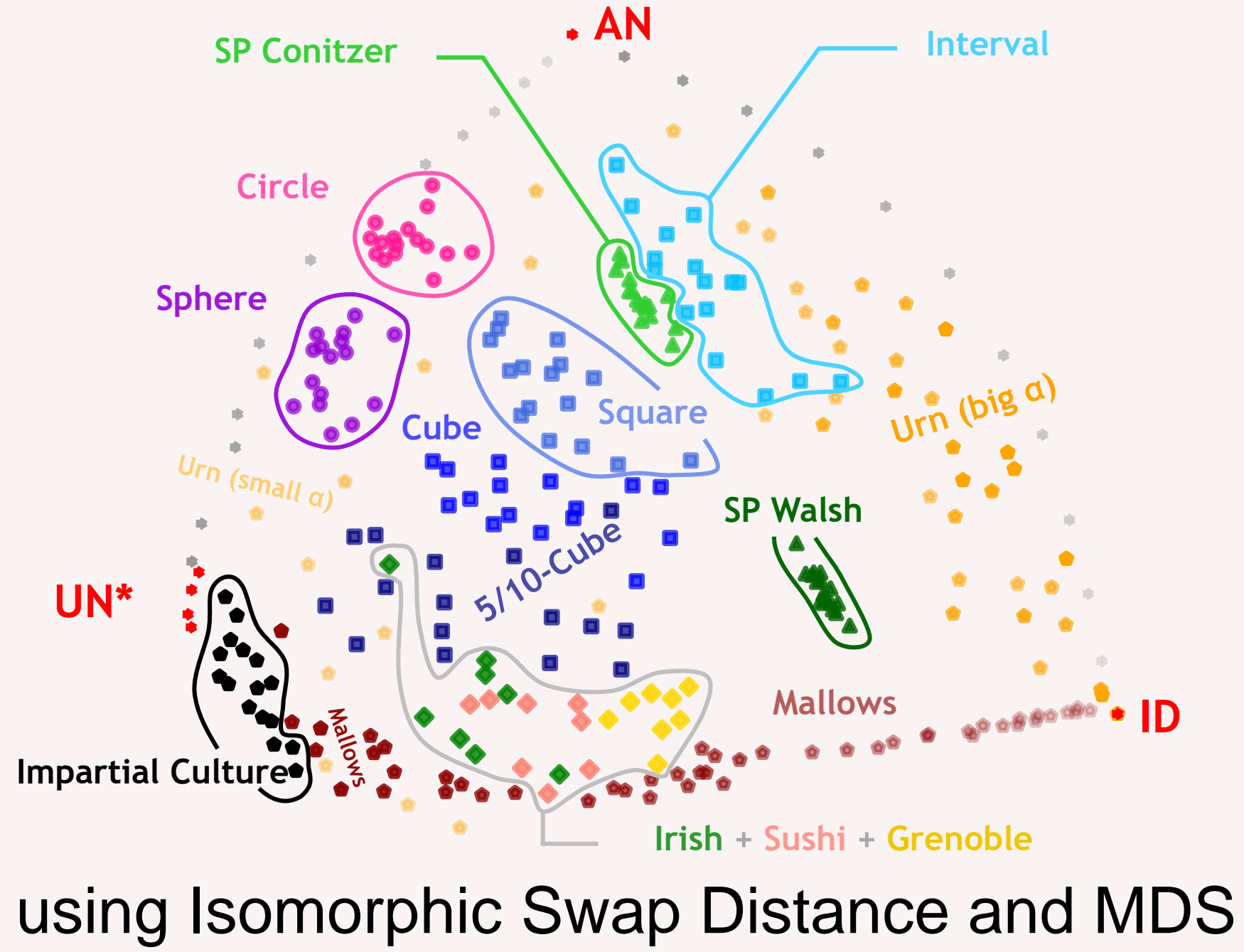
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Can we understand the positions in the *Map of Elections* in terms of diversity, agreement, and polarization?

## Map of Elections

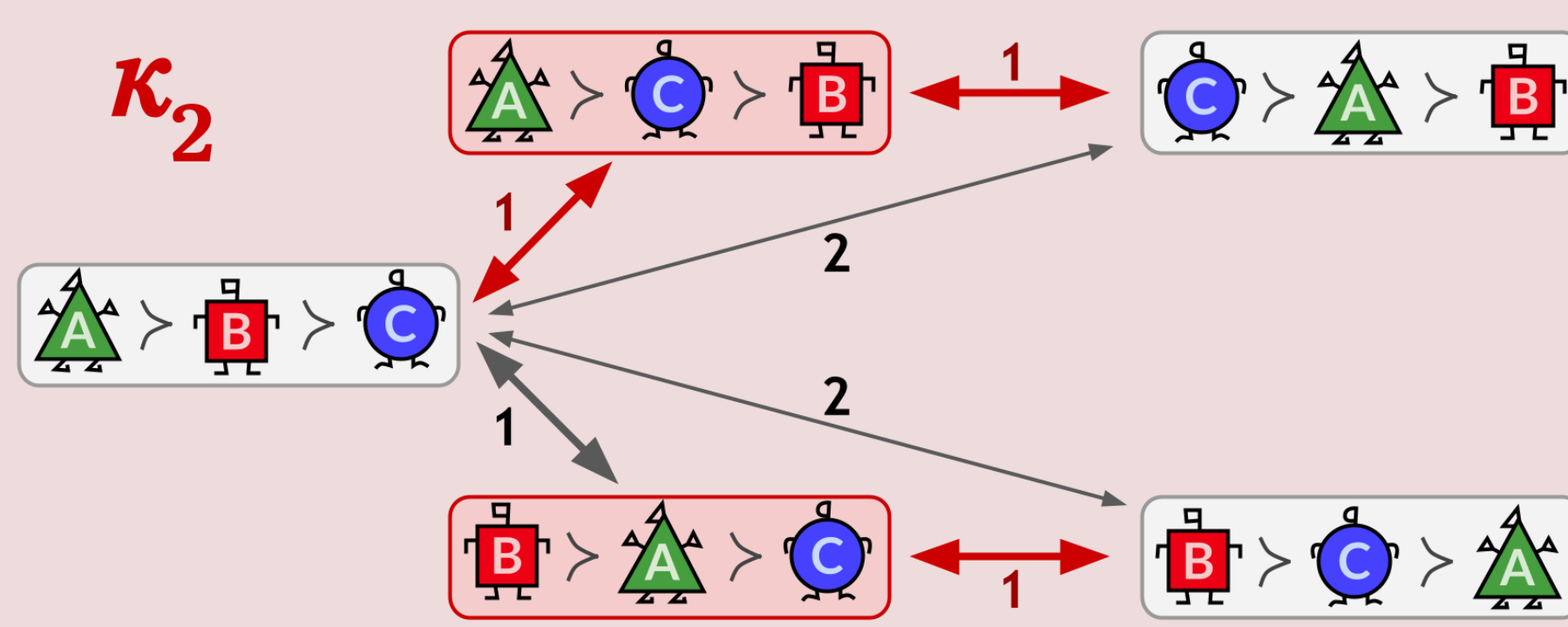
[Szufa et al., 2020; Boehmer et al., 2021]



## k-Kemeny Distance

$$\kappa_k = \min_{\{\lambda_1, \dots, \lambda_k\}} \sum_{\text{all votes } v} \min_{i \in [k]} \text{SwapDist}(v, \lambda_i)$$

Example:



## Agreement Index

[Alcalde-Unzu & Vorsatz, 2013; Hashemi & Endriss, 2014; Can et al., 2015]

$$A(E) = \sum_{\{a,b\} \subseteq C} \frac{\#\{v \in V: a >_v b\} - \#\{v \in V: b >_v a\}}{|V| \cdot |C| \cdot (|C| - 1)/2}$$

## Diversity Index

$$D(E) = \sum_{k \in [|V|]} \frac{\kappa_k(E)/k}{|V| \cdot |C| \cdot (|C| - 1)/2}$$

## Polarization Index

$$P(E) = \frac{2 \cdot (\kappa_1(E) - \kappa_2(E))}{|V| \cdot |C| \cdot (|C| - 1)/2}$$

