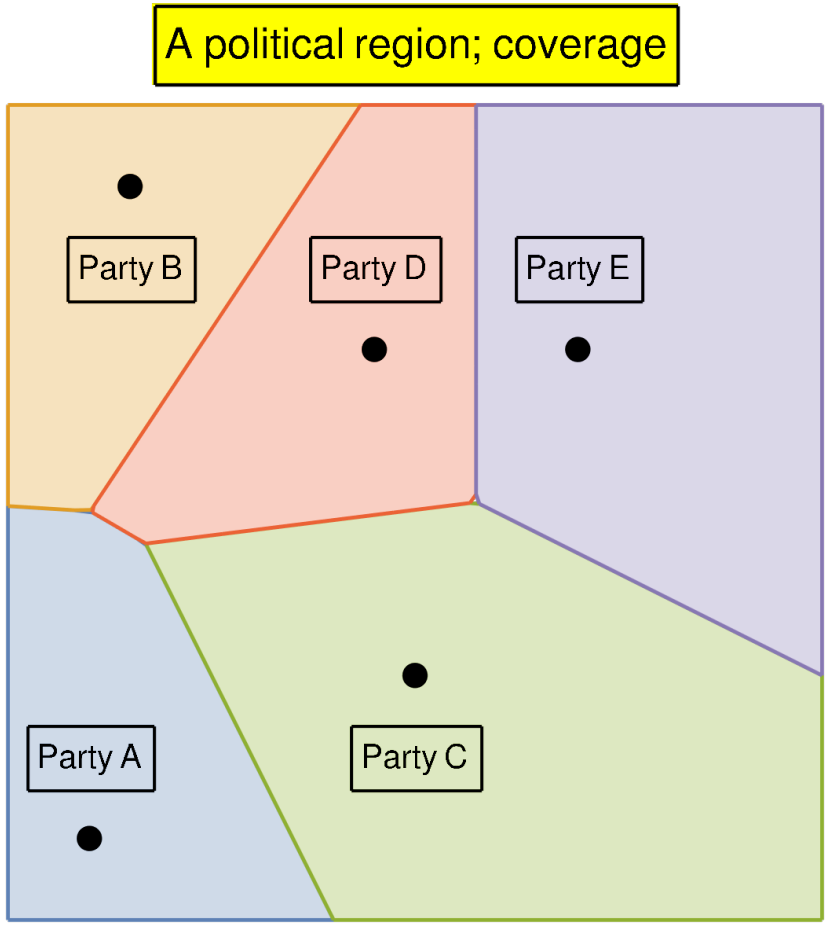
What is...Arrow's theorem?

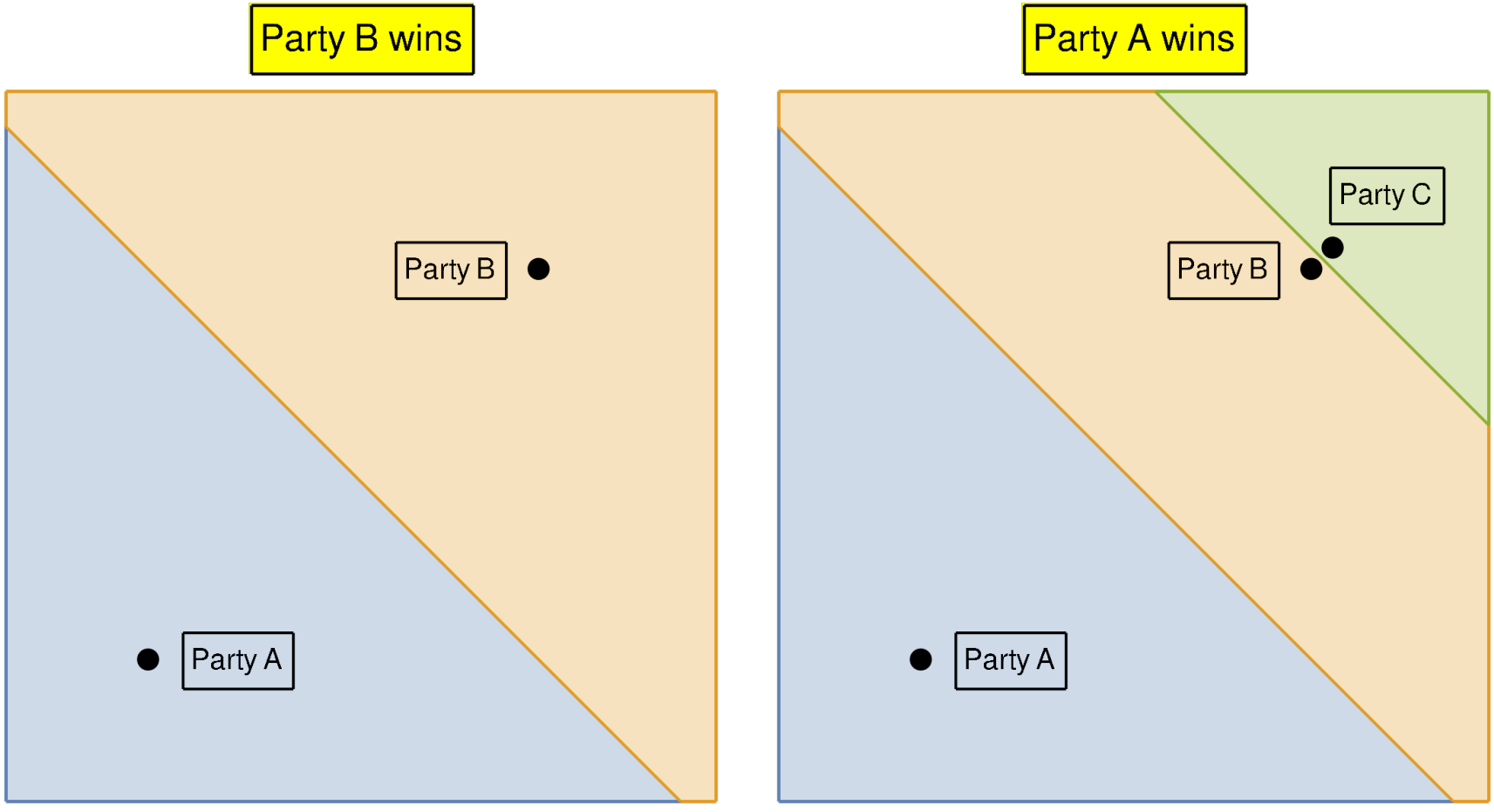
Or: Why voting is always flawed (and is still a good idea)

Parties and Voronoi diagrams



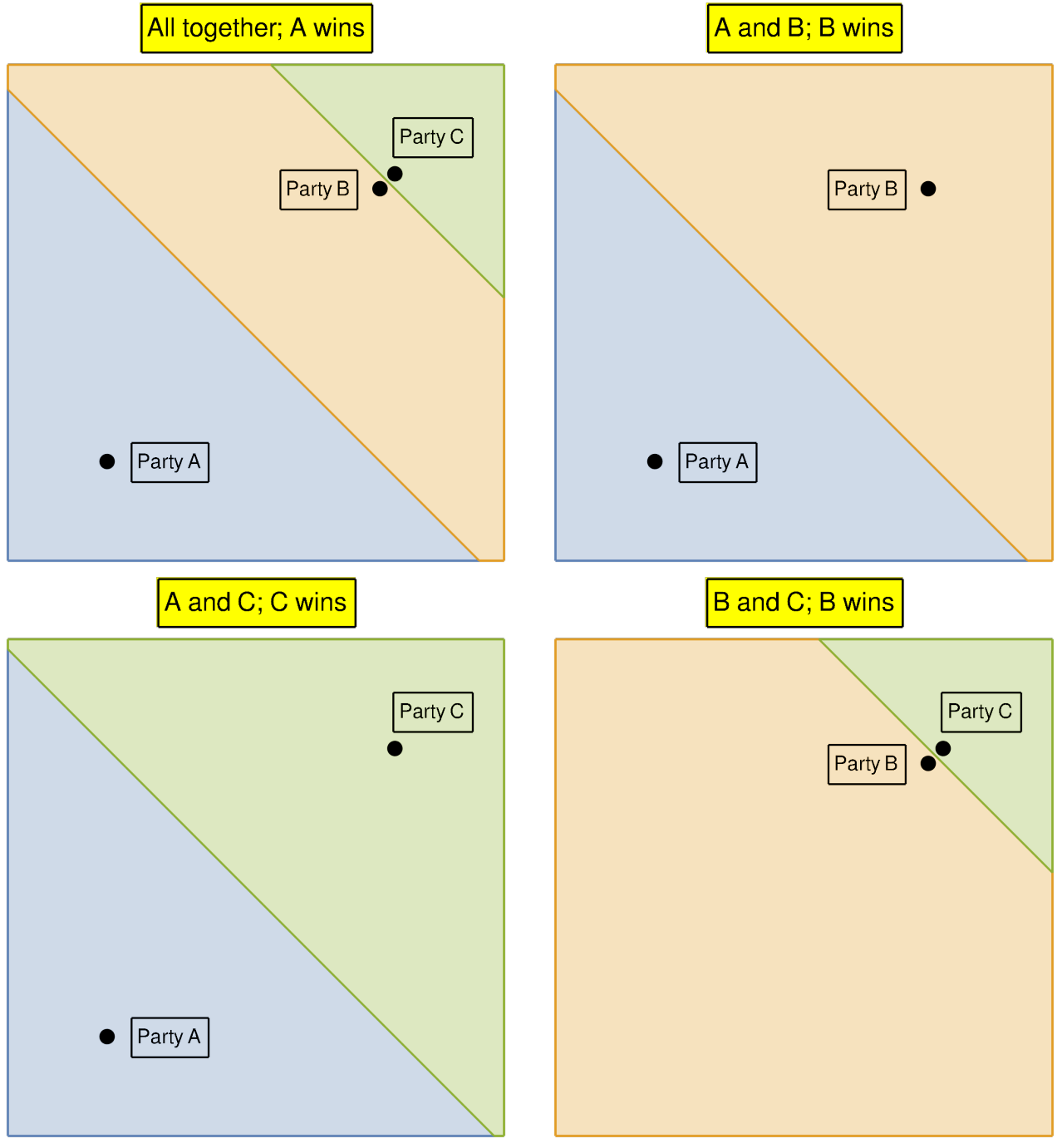
Point $(0.1, 0.6)$ means 10% Agreement with statement X, 60% Agreement with statement Y, the dots represent the parties, the regions their voter coverage

This is not transitive...?



Even in the right picture the majority prefers $B > A$

Condorcet's paradox in action



Enter, the theorem! (A short version of it.)

Say we have at least 3 choices and voters. Then there is no rank-order electoral system except 'Dictatorship' that satisfies the "fairness" criteria:

(a) If every voter prefers alternative A over alternative B, then the group prefers A over B

Sounds innocent, is mostly innocent

(b) If every voter's preference between A and B remains unchanged, then the group's preference between A and B will also remain unchanged

Sounds innocent, but it is not

Democracy and voting are still very important and good!

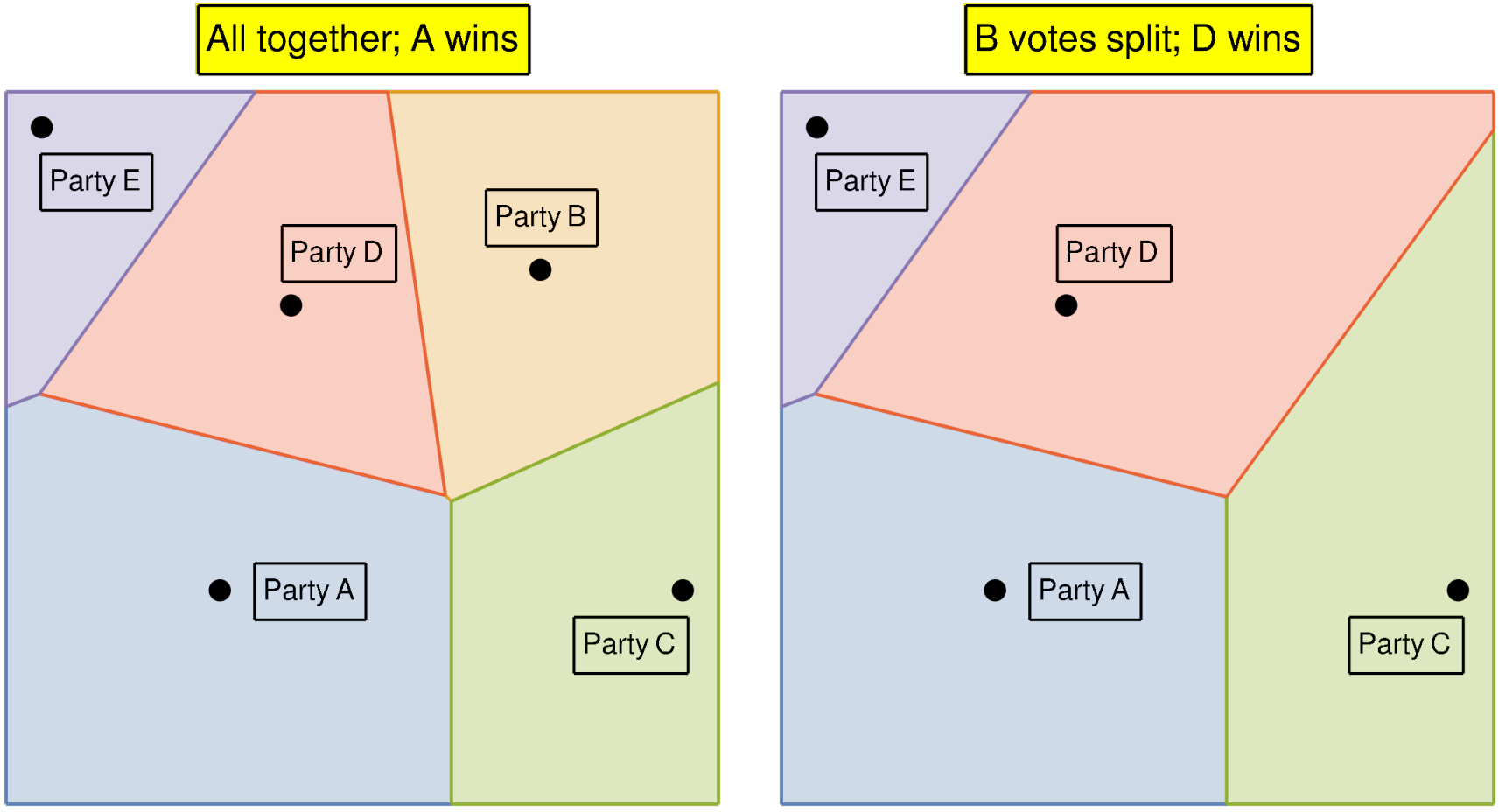
Most systems are not going to work badly all of the time

All I proved is that all can work badly at times

(Arrow)

Gibbard–Satterthwaite theorem, a.k.a. tactical voting exists

All ‘Non-dictatorships’ are manipulable



So voting is part of game-theory...

Thank you for your attention!

I hope that was of some help.