Split societies

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Elections are often surprisingly tight, and sometimes split the electorate into two solidly opposed camps [1]. These camps are not necessarily connected, but election maps generally show consistent clusters. Here, inspired by a recent contribution [2], we draw an analogy with the statistical behavior of magnets, wherein atoms tend to orient their spins with those of their neighbors.

Adapting the classical Ising model to account for the influence of opinion polls on a voter, we find that a new phase appears, in which two equal-sized camps solidify (figure 1, left). This ordered phase exists when the temperature is low enough, that is, when voters are strongly influenced by others (figure 1, right). Surprisingly, the susceptibility of this phase remains continuous, like that of the classical paramagnetic phase. Combining the fluctuation-dissipation theorem with a continuous model of the split-society phase, one can, in principle, estimate the influence of opinion polls from the fluctuations of their results.

Of course, such a simplistic model can only treat a voter's inner feelings as noise, but it nonetheless suggests that the outcome of modern elections reflects the feedback between voters and polls. We test this hypothesis against publicly-available election data.

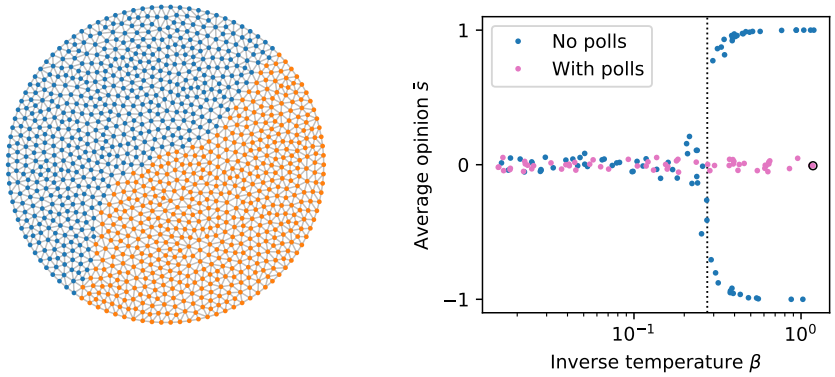

Figure 1. *Left:* Split-society phase on a triangular mesh (1046 nodes). Each node is a voter, connected to its neighbors as shown by gray lines. Blue and orange colors indicate the state of each voter ($s = +1$ or -1). *Right:* Average opinion $\bar{s}$ of the electorate shown on the left panel, as a function of the inverse temperature (numerical simulations using the Glauber algorithm). Blue dots: classical Ising model (no opinion polls). Pink dots: opinion polls influence voters. Dotted black line: critical temperature for the classical Ising model on a triangular mesh [3]. The black circle corresponds to the state shown on left panel.

References

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