Replicating Electoral Success

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AAAI-25 / IAAI-25 / EAAI-25
FEBRUARY 25 – MARCH 4, 2025 | PHILADELPHIA, USA

Full Paper

01 Background

Hotelling–Downs: Two office-seeking candidates will adopt the policy of the median voter

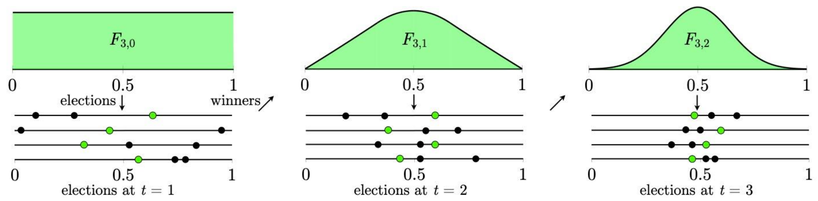
Duverger's Law: empirical finding that plurality leads to two-party systems.

Plurality Elections: each voter casts one vote, the candidate with the most votes wins

1-Euclidean Preferences: voters and candidates occupy points in the unit interval [0, 1]; voters prefer closer candidates.

How do the policies of boundedly rational candidates evolve over time?

02 Overview

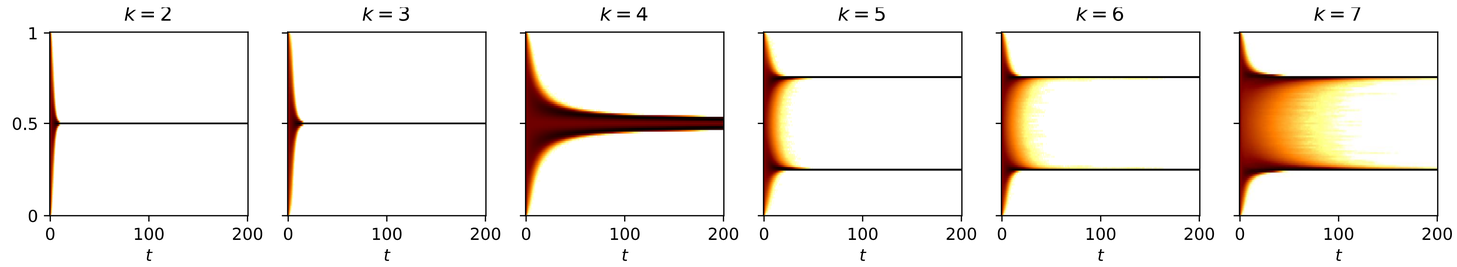


Our Model ≡ evolutionary replicator dynamics

- ✓ Population of k-candidate plurality elections proceeding in rounds
- ✓ Candidates copy an electorally successful policy from the previous round
- ✓ For theory: uniformly distributed voters

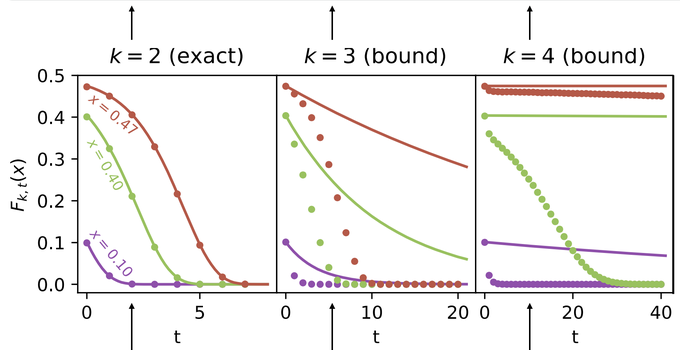
With few-candidate elections, policies converge to the center; with many candidates, they do not.

03 Results



Theorem: With $k \leq 4$ candidates per election, the candidate distribution converges to 1/2.

Theorem: With $k \geq 5$ candidates per election, the candidate distribution ***does not*** converge to 1/2.



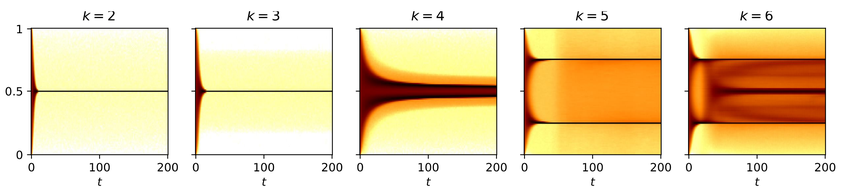
$$F_{2,t}(x) = \frac{[2F_0(x)]^{2^t}}{2}$$

$$F_{3,t}(x) \leq F_0(x) \cdot \left[\frac{3}{4} + F_0(x)^2\right]^t$$

$$F_{4,t}(x) \leq F_0(x) \cdot \left[1 - 4\left(\frac{1}{2} - F_0\left(\frac{x}{3} + \frac{1}{3}\right)\right)^3\right]^t$$

(F_0 symmetric, $x < 0.5$)

✓ **Our results hold even with noise:**

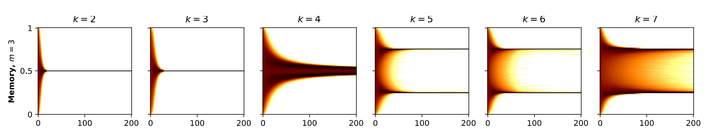


Theorem: With $k \leq 4$ candidates per election, ***some of which are positioned at random,*** the candidate distribution approximately converges to 1/2, but not when $k \geq 5$

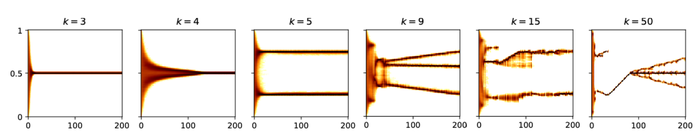
04 Further Simulations

✓ **Our results hold under variations of the model:**

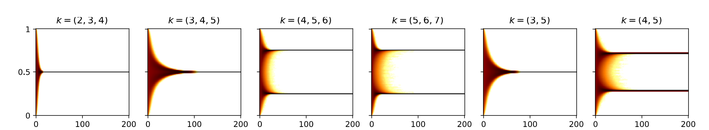
3-round Memory



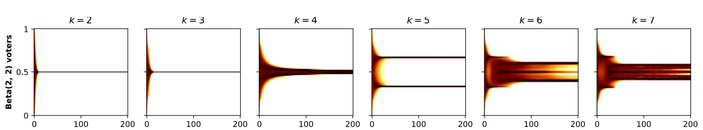
Imperfect Imitation



Mixture of Candidates



Beta(2,,2) Voter Dist.



Research supported in part by:
NSF
U.S. Department of Defense
MacArthur Foundation
SIM
NSF FOUNDATION