

Discontinuous codimension-two bifurcation in a Vlasov system

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What is the Vlasov (collisionless Boltzmann) system?

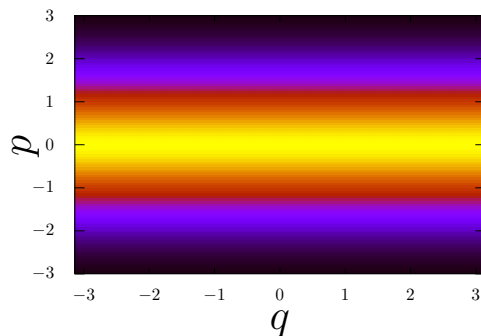
= Dynamics of **long-range** Hamiltonian system by 1-body dist

Examples:

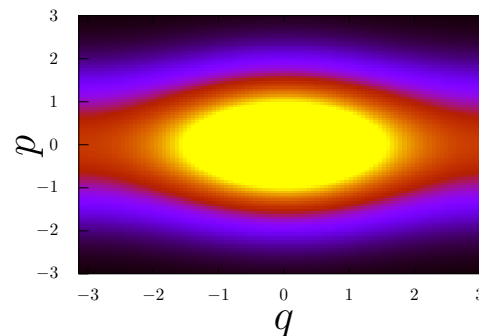
- Self-gravitating systems
- Plasmas
- 2D Euler fluids
- Ising/XY spins

Bifurcation in Vlasov: Assume the position q is periodic

1-body dist $F_{\text{ini}}(q, p)$: Non-clustered state is stationary

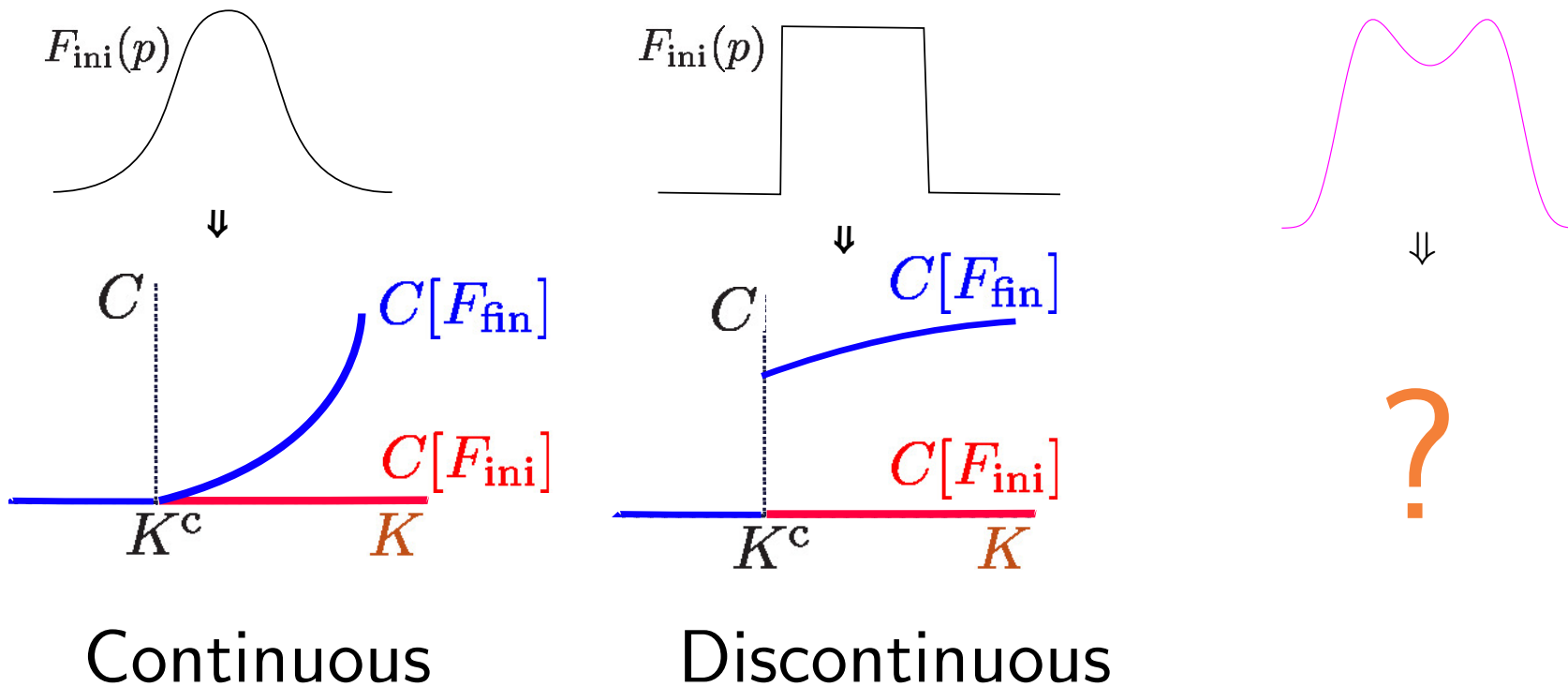


if unstable
 $\xrightarrow{t \rightarrow \infty}$



Final Cluster size C
for unstable $F_{\text{ini}}(p)$?

Knowns and Questions (K : coupling strength)



Q1 Where is the boundary of flatness?

Q2 For two-peak distributions?

Q3 How can we unify them?

We answer them via codim-2 bifurcation (tuning of 2 params)