

A new unified economic theory

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A new unified economic theory



This talk presents a new unified economic theory that relaxes the capitalistic diffusive approximation made for control so that there is coordinated, yet distributed, monetary and fiscal (print/grant investment) policy made to maximize GDP, not Discounted Cash Flow (DCF). This is a socialist, not a capitalistic metric, where the economic system is treated as a web (multiscale graph) of economic communes. The local microeconomics is treated like the global macroeconomics. The viscous forecasting and control is replaced by a Generative Artificial Intelligence (genAI) forecasting and control. The control is distributed (that is, democratic), not centralized (that is autocratic). Monetarism argues for only an autocratic (centralized) capitalistic (profit based) monetary control, and Keynesianism argues for only an autocratic capitalistic fiscal (borrow/spend investment) control. This new theory argues for coordinated democratic socialist monetary and fiscal control. It does have philosophical connections to African Ubuntu, the Economics of Mutuality, Modern Monetary Theory, and Marxian Economics. It also makes the connection between genAI and the physics of economic collective systems. The result is an economic system that maximizes the good of society, not an economic system that maximally exploits society.

A new unified economic theory



monetary
(money)

Monetarism

central bank v money supply control,
that is, autocratic capitalistic monetary policy and control

fiscal
(investment)

Keynesianism

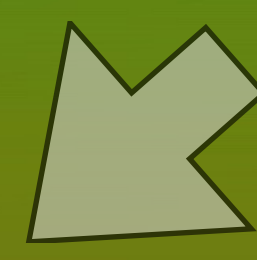
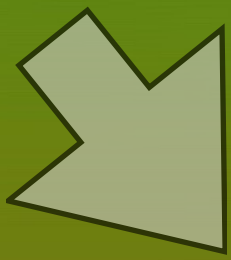
borrow/spend investment by central government with v,
that is, autocratic capitalistic fiscal policy and control

macroeconomic

$$GDP = MV$$

microeconomic

$$\max(\text{DCF}), \text{NPV} \geq 0$$



multiscale web (graph) of economic collectives

distributed, constrained optimization of:

$$mSR = \frac{mS}{T_b} \int_0^{T_0} R(\tau) d\tau$$

that is,
 $GDP = mR = \frac{M}{S} = MV$
or $M = mSR$

note: each economic collective has its own electronic currency, that is transactional equity,
with coordinated Ubuntu (print/invest) Financing

Release web of economic collectives from tyranny of viscosity, to become an economic superconductor



genAI forecast & control

$$\max (mSR)$$

$$I \leq mSR$$

that is, no inflation



v forecast & control

$$\max (DCF)$$

$$I \leq DCF$$

that is, NPV ≥ 0



creates an **economic superconductor**
free of resistance, that is debt

$$\frac{R - E}{R} \equiv \text{profit margin}$$

$$T_b \equiv \text{payback time}$$

$$T_0 \equiv \text{lifetime}$$

$$m \equiv \text{network multiplier}$$

$$S \equiv \text{temporal or savings multiplier}$$

$$mSR \equiv \frac{mS}{T_b} \int_0^{T_0} R d\tau = M = \text{money supply}$$

$$DCF \equiv \int_0^{T_0} (R - E) e^{-\nu\tau} d\tau = M = \text{Discounted Cash Flow}$$

$$NPV \equiv DCF - I = \text{Net Present Value}$$

$$I \equiv \text{Investment}$$

$$R \equiv \text{Revenue}$$

$$E \equiv \text{Expenses}$$

$$\nu \equiv \text{discount or interest rate}$$

$$DCF = mSR \left(\frac{R - E}{R} \right) \left(\frac{e^{-\nu T_b}}{\nu T_0} \right) \left(\frac{T_b}{mS} \right)$$

$$DCF \ll mSR \quad (\text{by factor of } 10^1 \text{ to } 10^3)$$

Mathematical methods of constrained functional optimization: core mathematics of economics and physics



optimize $\int_0^{T_0} R(q(\tau)) e^{-\nu\tau} d\tau$ subject to the constraint $\frac{dq}{d\tau} = f(q, \dot{q})$

Lagrangian

method of Lagrange multipliers

$$L(q, \dot{q}) \equiv L_0(q, \dot{q}) - R(q)$$

$$\frac{d}{d\tau} \left(\frac{\partial L}{\partial \dot{q}} \right) - \frac{\partial L}{\partial q} = 0 \quad \text{(Lagrange's equation)} \quad \text{or } \delta S = 0$$

Hamiltonian

via Legendre transformation

$$H(p, q) \equiv p \dot{q} - L(q, \dot{q}) = p f(p, q) + R(q) \quad p \equiv \frac{\partial L}{\partial \dot{q}}$$

$$\frac{dq}{d\tau} = \frac{\partial H}{\partial p} \quad \text{and} \quad \frac{dp}{d\tau} = -\frac{\partial H}{\partial q} \quad \text{(Hamilton's equations)}$$

Generator of Canonical Transformation

$$S(P, E; q, \tau) \equiv \int L(q(\tau), \dot{q}(\tau)) d\tau = S_P(q) - E_P \tau$$

$$\frac{\partial S(P, E; q, \tau)}{\partial \tau} + H(\partial S / \partial q, q) = 0 + \nu S$$

(Hamilton-Jacobi equation + viscosity)

$$S_P(q) \equiv \int p dq = \text{action}$$

= - entropy

= $\tilde{V}_\theta(s)$ = approximate value function (DRL)

= $\ln \tilde{\rho}_\theta(x)$ = approximate distribution or score function (GPT)

= Hamilton's Characteristic Function

= generating function of canonical transformation

Geodesic Puppet Master of the collective: physics of genAI and collective systems



collective

$$[\pi_i(x), f_i(x)]$$

Puppet Master viewed via a Hall of Mirrors

from the 1928 movie "The Circus" starring Charlie Chaplin
"The Mirror Maze" scene

funhouse
Hall of Mirrors



HST

$$S_p[f(x)]$$

$$= \ln \rho[\pi(x), f(x)]$$

$$= \ln \rho(x)$$



Yad Vashem
"The Children's Memorial"



individual

$$(p_i, q_i)$$

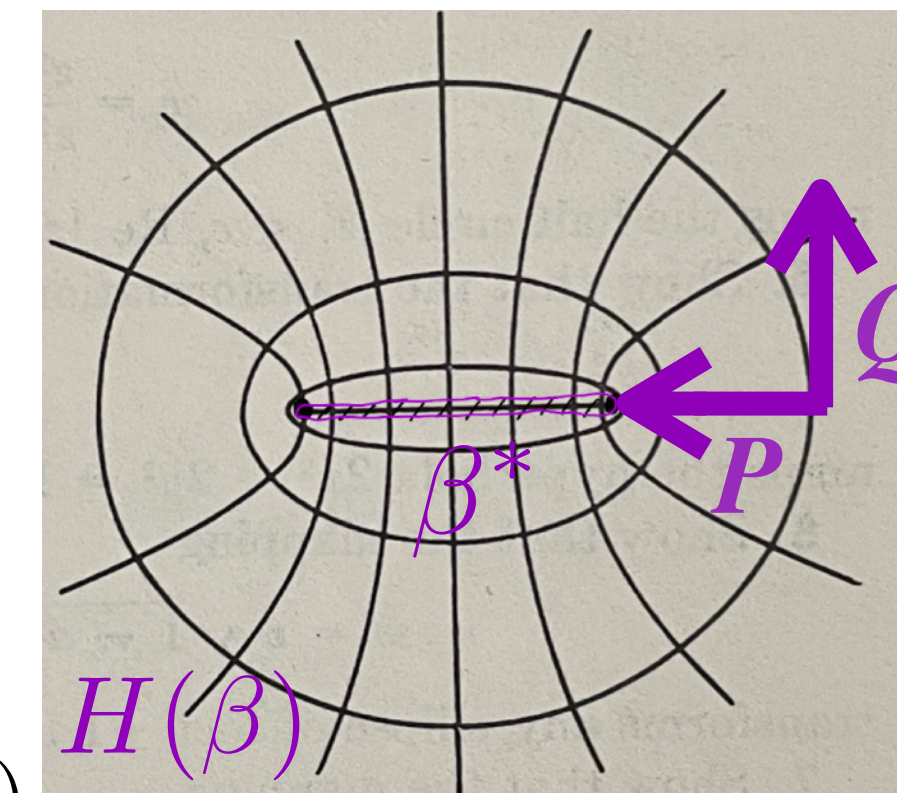


HJB

$$S_P(q)$$

$$= \tilde{V}_\theta(s) = \ln \rho_\theta(x)$$

$$= \ln \rho(p, q)$$



geodesics

$$(P_i, Q_i)$$

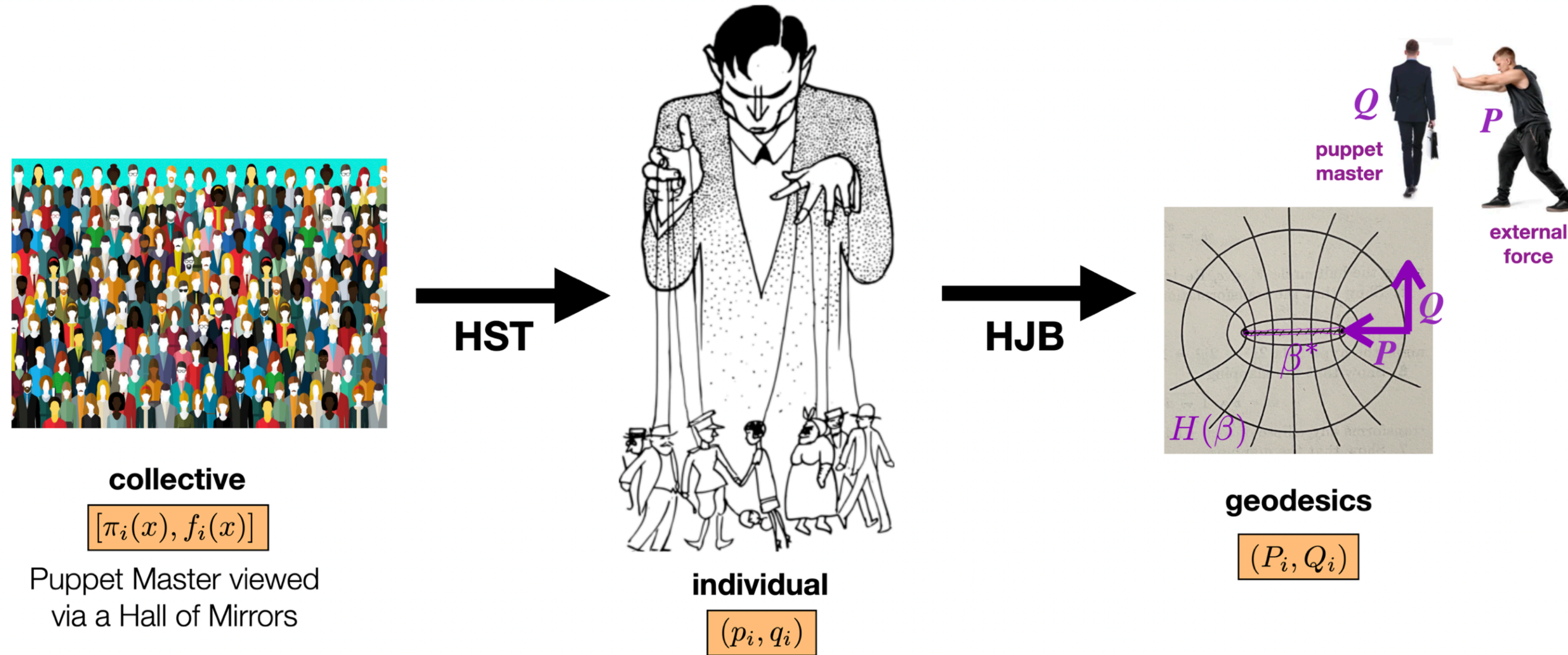


Q
puppet master



P
external force

This new genAI creates a virtual Puppet Master that conducts a prosperous stable economic collective



Glinsky, to be submitted to Nature,
arXiv:2401.04846 (2024)

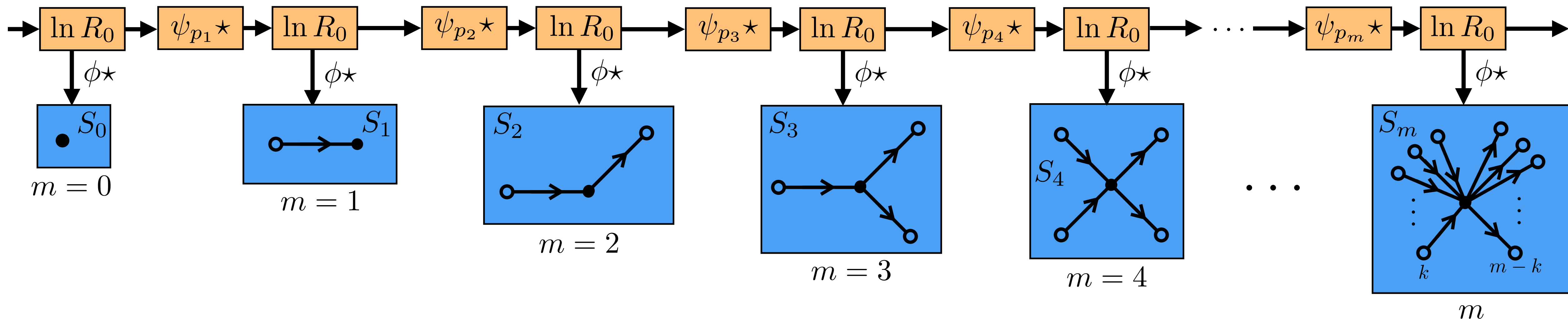
The approach to genAI recognizes the economy is a collective of individuals, as such, there emerges a collective behavior or virtual individual that determines, that is controls, the collective behavior. This control emanates from a simply beautiful symmetry — the coordination of the economically interacting individuals creating an economic force, and the economic force then coordinating the economic trade of the individuals. Another way of looking at this is that the actions of the virtual Puppet Master, who follows a geodesic motion, are approximated by genAI. The genAI then generates and multiply reflects the actions of the Puppet Master through a Hall of Mirrors to obtain, that is forecast, the economic evolution of the collective. This is demonstrated by “The Mirror Maze” scene from the 1928 Charlie Chaplin movie “The Circus”. [link from the Puppet Master illustration]

Given how the actions of the Puppet Master are multiply reflected through the Hall of Mirrors, the state of economic prosperity can be stabilized by the Ponderomotive Method of Control. This method of control is similar to the way that a sheepdog herds sheep. The sheepdog runs around the herd very fast, compared to movements of the herd, nipping at the heels of the sheep (vibrating them) if they wonder away from the mountain pass, that is the state of economic prosperity. The sheepdog is effectively creating a small alpine valley at the mountain pass. More details on the BNZ approach to genAI can be found in this YouTube video and the corresponding paper that is going to be submitted to Nature. [link from the citation]

Mayer Cluster Expansion of collective systems **or** HST **or** Heisenberg's S-matrix **or** m-Body Scattering Cross Sections (a generating functional or deep deconvolution)



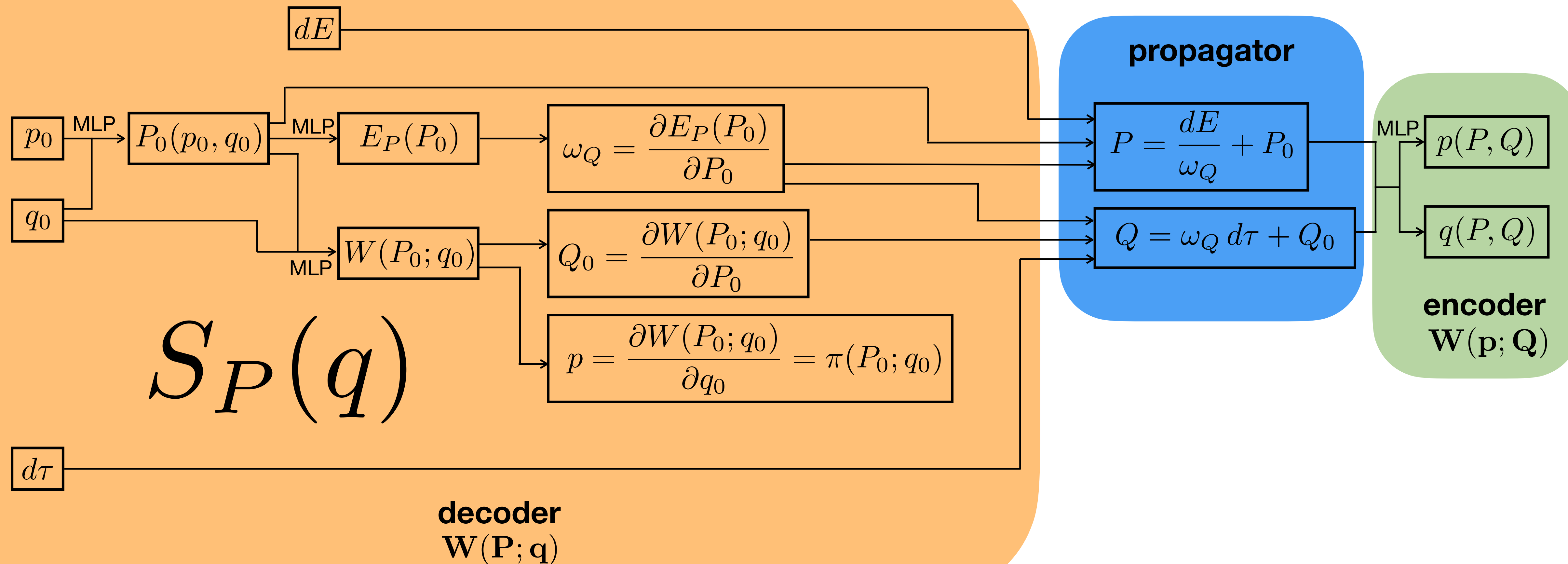
$$S_p[f(x)]$$



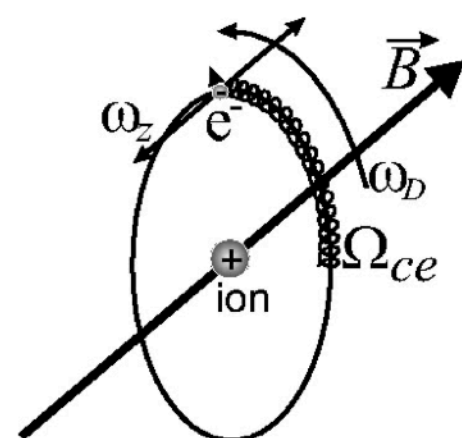
Neural Network architecture to solve HJB for the generator of the canonical flow



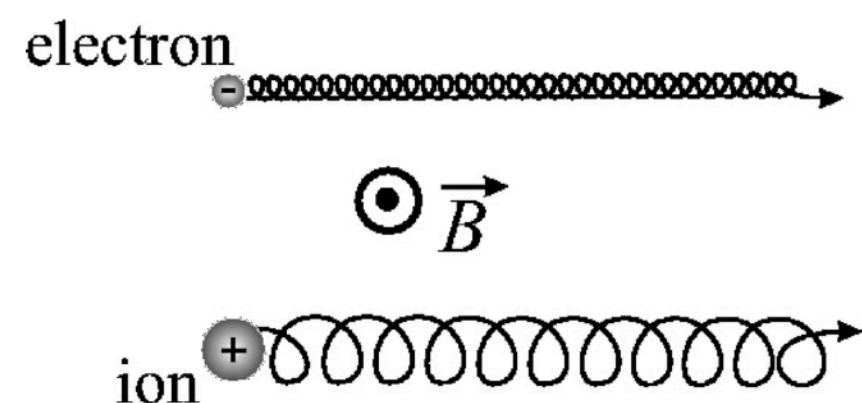
(a generating function or decoder)



An example of a physical system



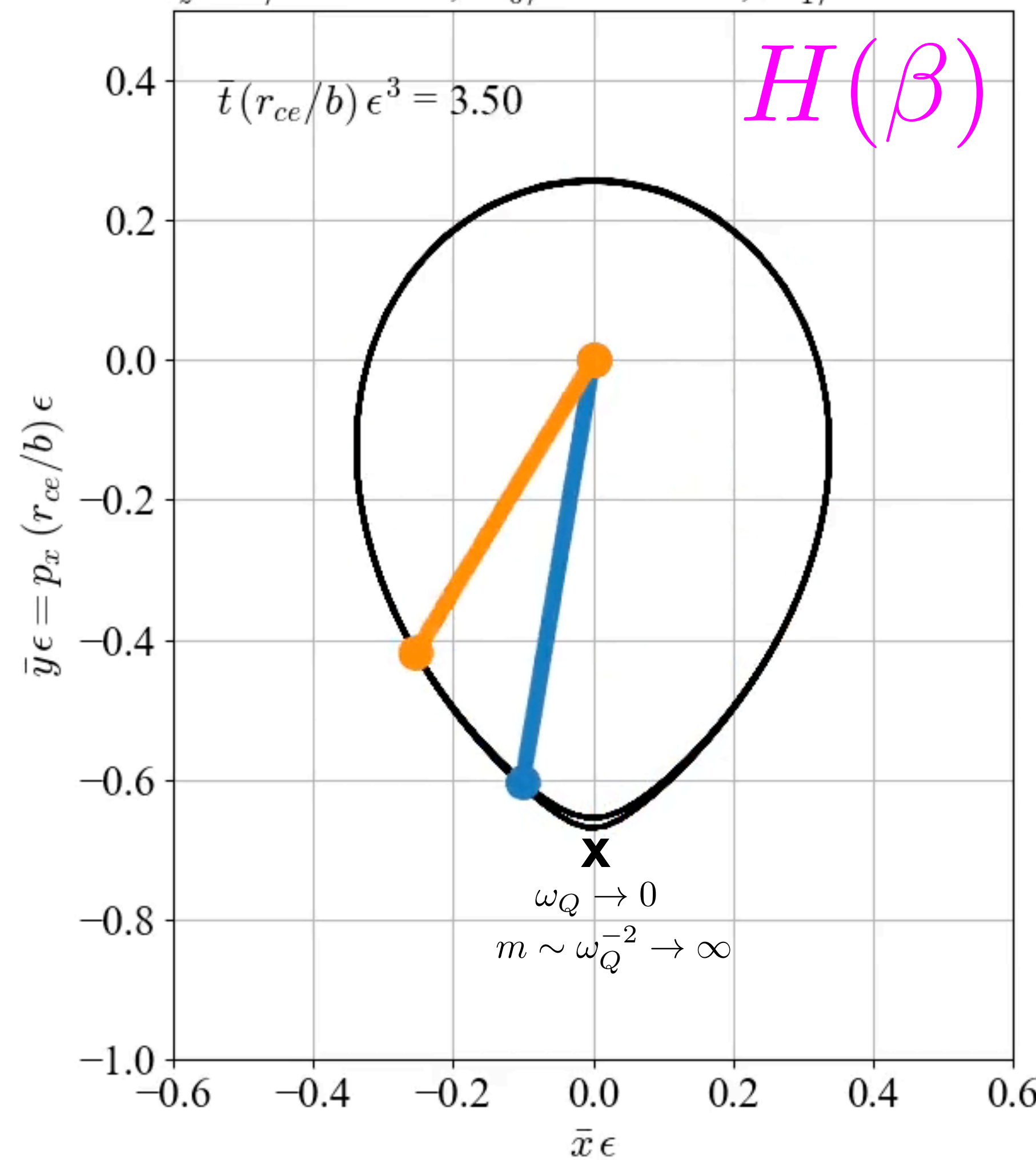
guiding center atom (GCA)



drifting pair (DP)

guiding center atom

$$\bar{J}_z \epsilon^{1/2} / 2\pi = 0.40, \bar{H}_0 / \epsilon = -1.6050, \bar{H}_1 / \epsilon = -1.6035$$



$$\bar{H}_s / \epsilon = -1.6022$$

qitech.biz/videos/phase_space_2.html

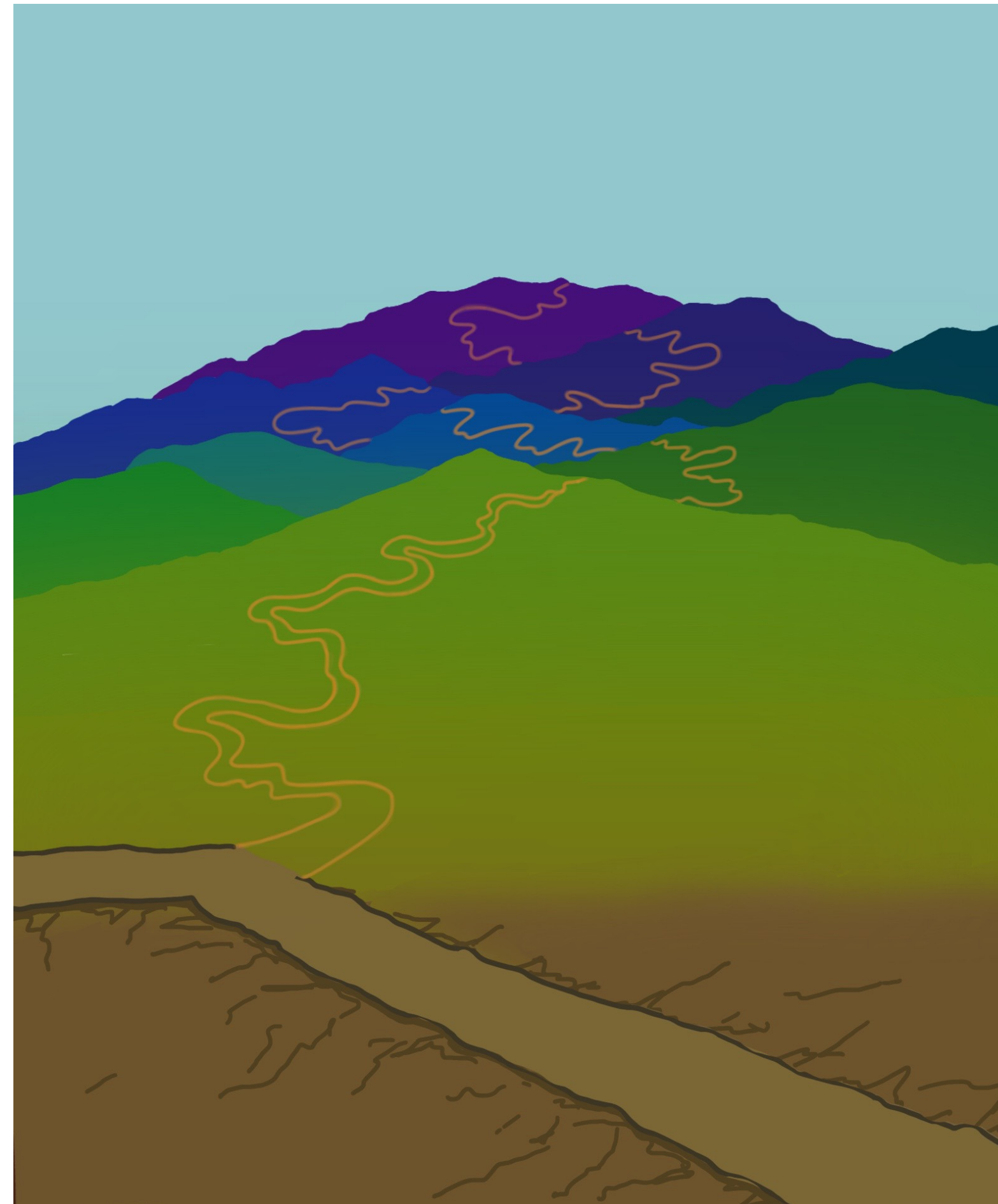
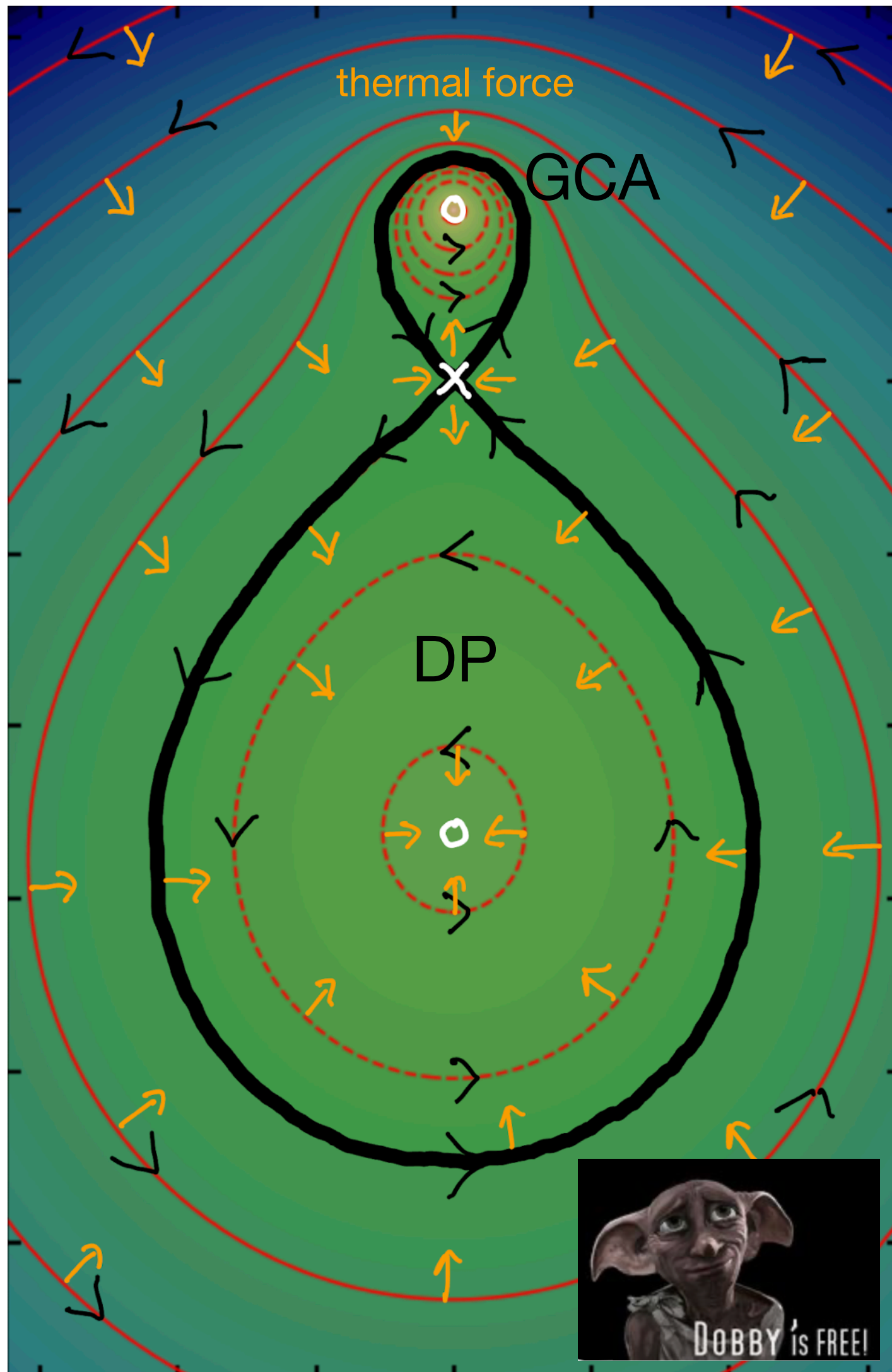
$$\omega_{Q0} = 2.33$$

$$\omega_{Q1} = 2.03$$

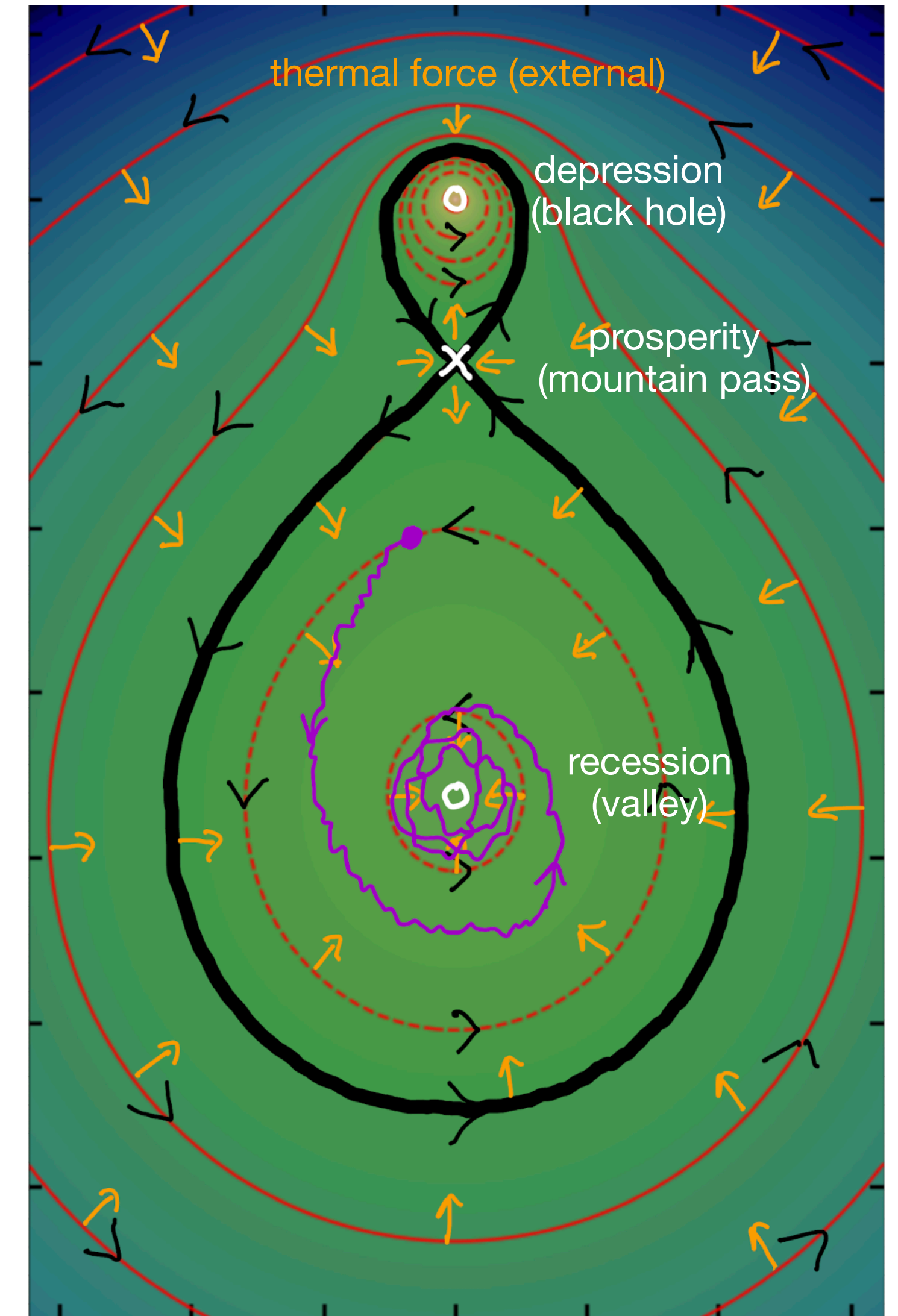
Glinsky and O'Neil, Phys. Fluids B **3**, 1279 (1991)

Kuzmin, O'Neil and Glinsky, Phys. Plasmas **11**, 2382 (2004)

Phase space evolutions

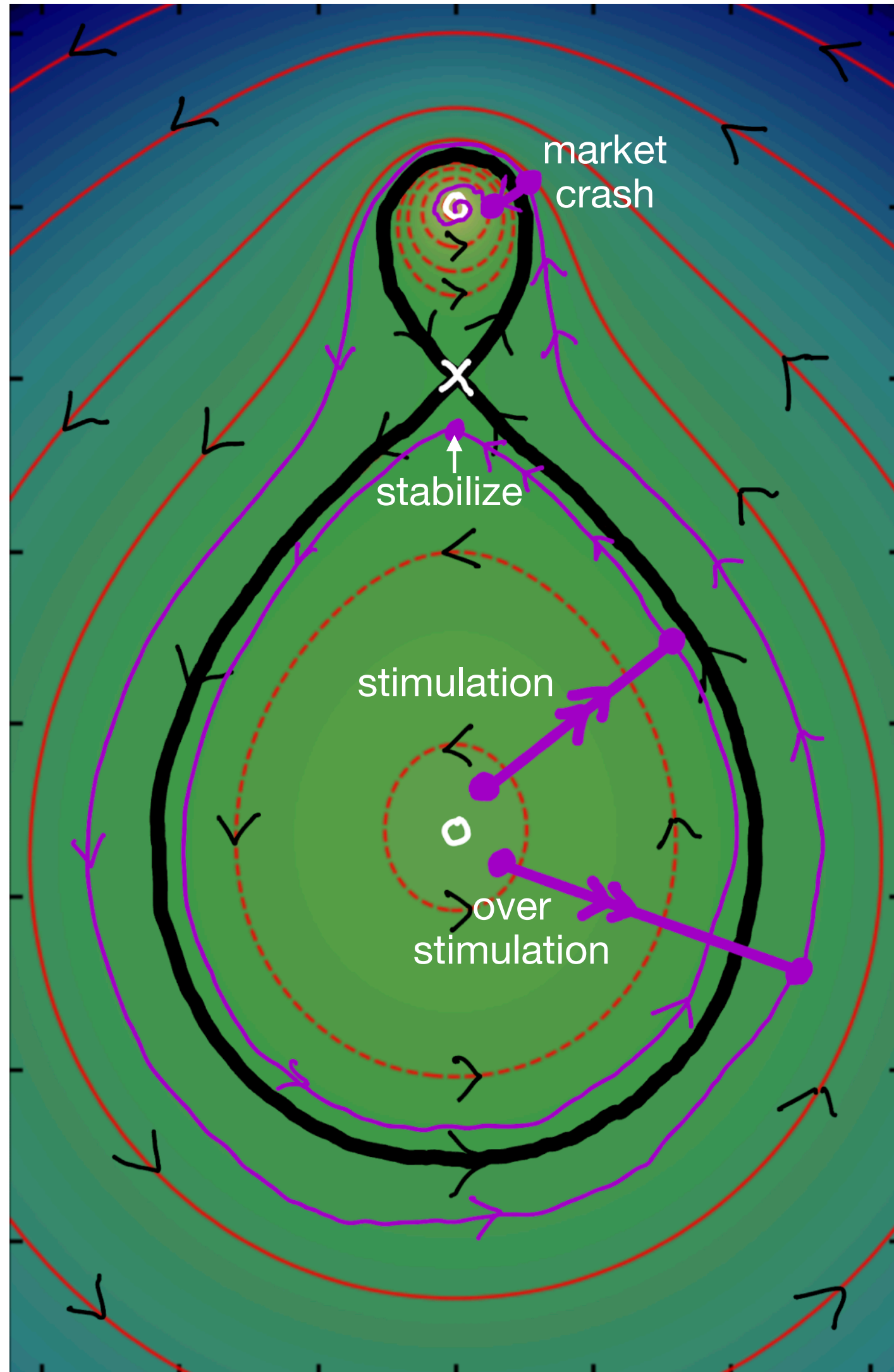


thermal equilibrium

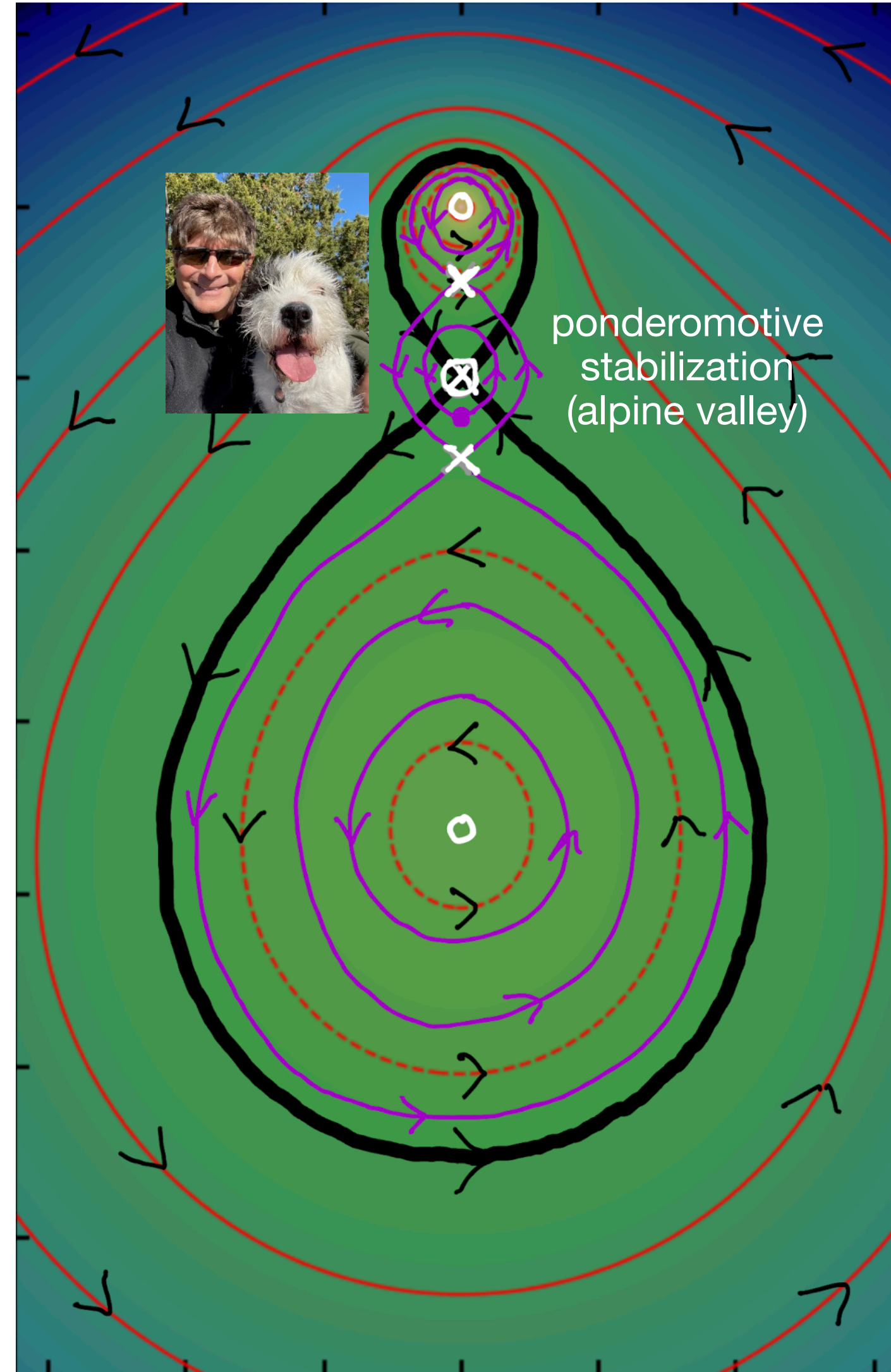


Ponderomotive stabilization of saddle point

stimulation



stabilization



The ponderomotive method of control is similar to the way that a sheepdog herds sheep. It runs around the herd very fast, compared to movements of the herd, nipping at the heels of the sheep (vibrating them) if they wonder away from the metastable equilibrium of economic prosperity. The sheepdog is effectively creating a small alpine valley at the mountain pass. Practically, this is a high frequency arbitrage trading of the transactional equity that provides liquidity.

Methods of collective system control



Jimmy Carter tries to shepherd the new free society emerging from the 1960's (The Great Society), which wanders out of control

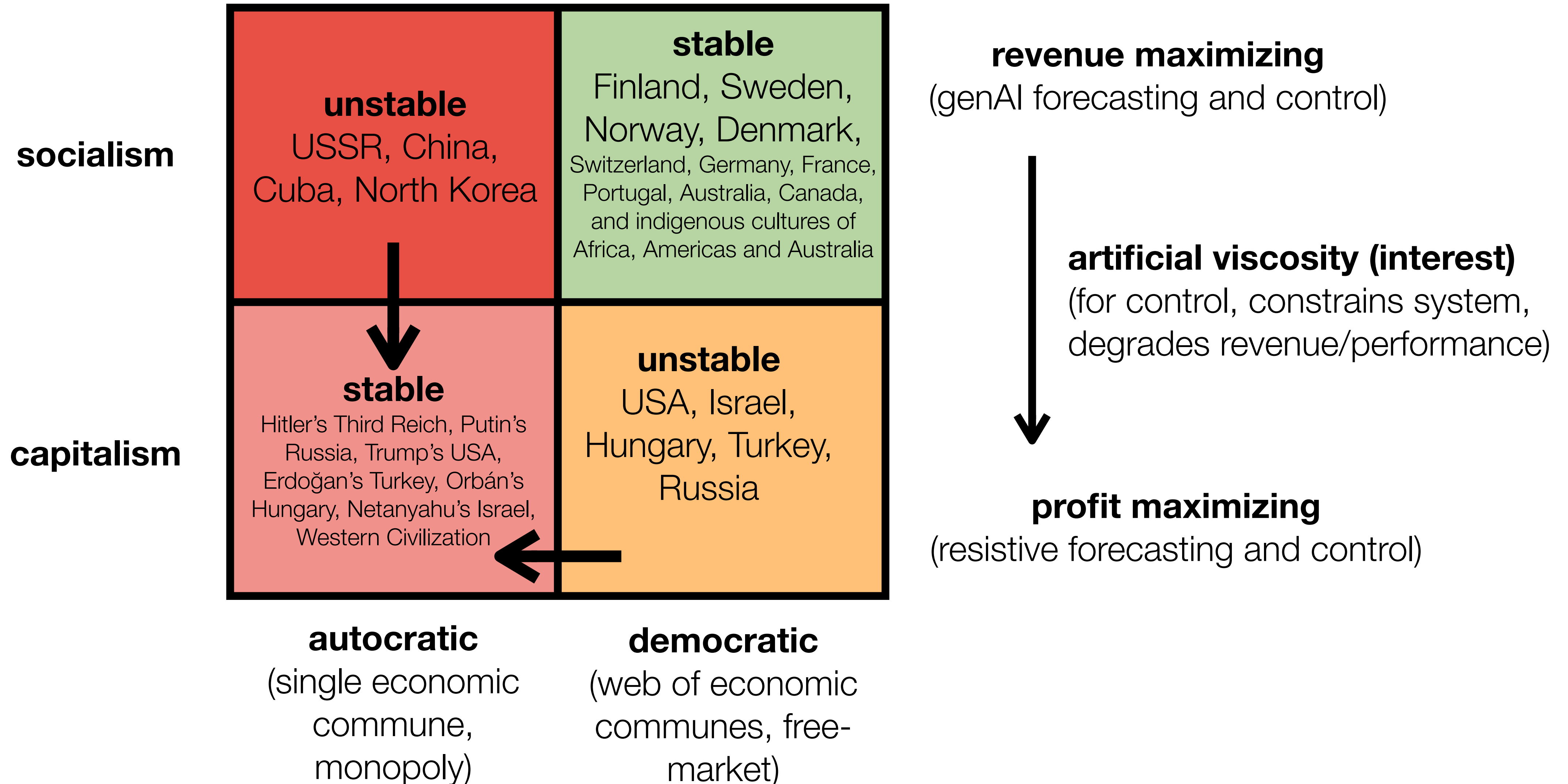


The dystopian response is Lewis Powell and the cabal locking up society



Because of transactional equity and AI, we are at the dawn of a new era of sustainable economic prosperity, in an alpine valley shepherded by AI

Matrix of economic collective systems based on the objective and distribution of control



Economic collective systems



- **Democratic Socialism** is stable with *high performance*, and are the happiest countries in the world

- ◆ American West (1830-1860) was developed using multiple paper currencies
 - ▶ led by Wells Fargo Bank (founded 1852)
 - ▶ 2x decrease in prices due to increased productivity (deflation)
 - ▶ 100x increase in GDP



- ◆ REI Co-op
 - ▶ 90 years old, premier US retailer of camping gear
 - ▶ \$4 billion/yr in revenue, 15,000 employees



- ◆ **distribution** of wealth, power, and control to customize guidance (that is sharing, **leading to free-market and democracy**)

- **Autocratic Capitalism** is stable with *poor performance*

- **Autocratic Socialism** is unstable with *very poor performance*

- **Democratic Capitalism** is unstable with *modest performance*

- ◆ *Capitalism & Freedom* of Milton Friedman and the “UChicago” School

- ◆ firms have short lifetimes (average of 15 years)

- ▶ diffusive model does not capture disruptions, force of profit prevents transition through market disruptions

- ▶ the resistivity of 6.7% interest constrains and grinds the business to a halt in 15 years (self-fulfilling prophesy)

- ◆ **concentration** of wealth, power, and control to monopolize guidance (that is greed, **leading to monopoly and autocracy**)

Ubuntu versus greed

- “better to share, than be greedy”, **Ubuntu way of mutuality**, that is “interconnectedness”
 - ◆ share toys by putting them in a community toy chest, more toys from which to choose
 - ◆ community software chest is Github
 - ◆ community capital chest is Martin Luther’s Community Chest of the Protestant Reformation
 - ◆ electronic transaction equity version of community capital chest is Ubuntu Financing
- **sharing** business model, or **Ubuntu** business model:
 - ◆ sustainable revenue maximizing
 - ◆ business cycle (2-6 year) of savings and inventory (both input and output)
 - ◆ forecast using genAI models
 - ◆ Ubuntu (print/invest) Finance with transparency
 - ◆ stakeholders (employees, suppliers and customers) are stockholders (owners)
 - ◆ socially responsible (respect the dignity of employees, suppliers and customers)
- **greedy** business model, or **conventional debt based** business model:
 - ◆ short term profit maximizing
 - ◆ transaction cycle (15 days or Just-In-Time) of savings and inventory
 - ◆ forecast using diffusive model (i.e., Discounted Cash Flow or Black-Scholes Equation)
 - ◆ debt finance (borrow/loan) with secrecy
 - ◆ stockholders are not stakeholders
 - ◆ exploit society (the is, employees, suppliers, customers, and intellectual property)
- Ubuntu business model creates an **economic superconductor** free of resistance, that is debt
- Ubuntu business model has **demonstrated exceptional performance**, 10x value, 100x investment



“Ubuntu versus greed” by OpenAi’s DALL-E

The consequences of greed



A pile of money is not entitled to homage or periodic indulgence, that is additional money being added to the pile. A vendor is not entitled to multiples of what they have invested or will invest in a good or service, in compensation for that good or service.

Generative Artificial Intelligence (genAI) is about better forecasting and control of collective systems, leading to better decisions, and ultimately social (including economic) good — enlightenment, not entitlement.



Indulgence or usury leads to resistive control like going full gas on a motorcycle, then braking to control the speed. It is effective control but wasteful of energy and leads to much less performance.

For an economic collective, this effectively stabilizes and controls the economic collective, but constrains the economic collective from reaching the maximum level of sustainable economic activity, and robs it of revenue needed for sustenance and growth.

- new unified economic theory is stable **Democratic Socialism**, that is **African Ubuntu philosophy**, which:
 - ◆ relaxes the capitalistic diffusive approximation made for control so that there is coordinated, yet distributed, monetary and fiscal policy made to maximize GDP, not DCF
 - ◆ replaces viscous forecasting and control with genAI forecasting and control
- replaces stable **Autocratic Capitalism**, that is **fascist philosophy**, which has:
 - ◆ uncoordinated viscosity-based centralized Monetarism (for monetary policy) and Keynesianism (for fiscal policy)

fascism to Ubuntu



Autocratic Capitalism



Democratic Socialism