Family Dynamics: Social-Selection Perspective

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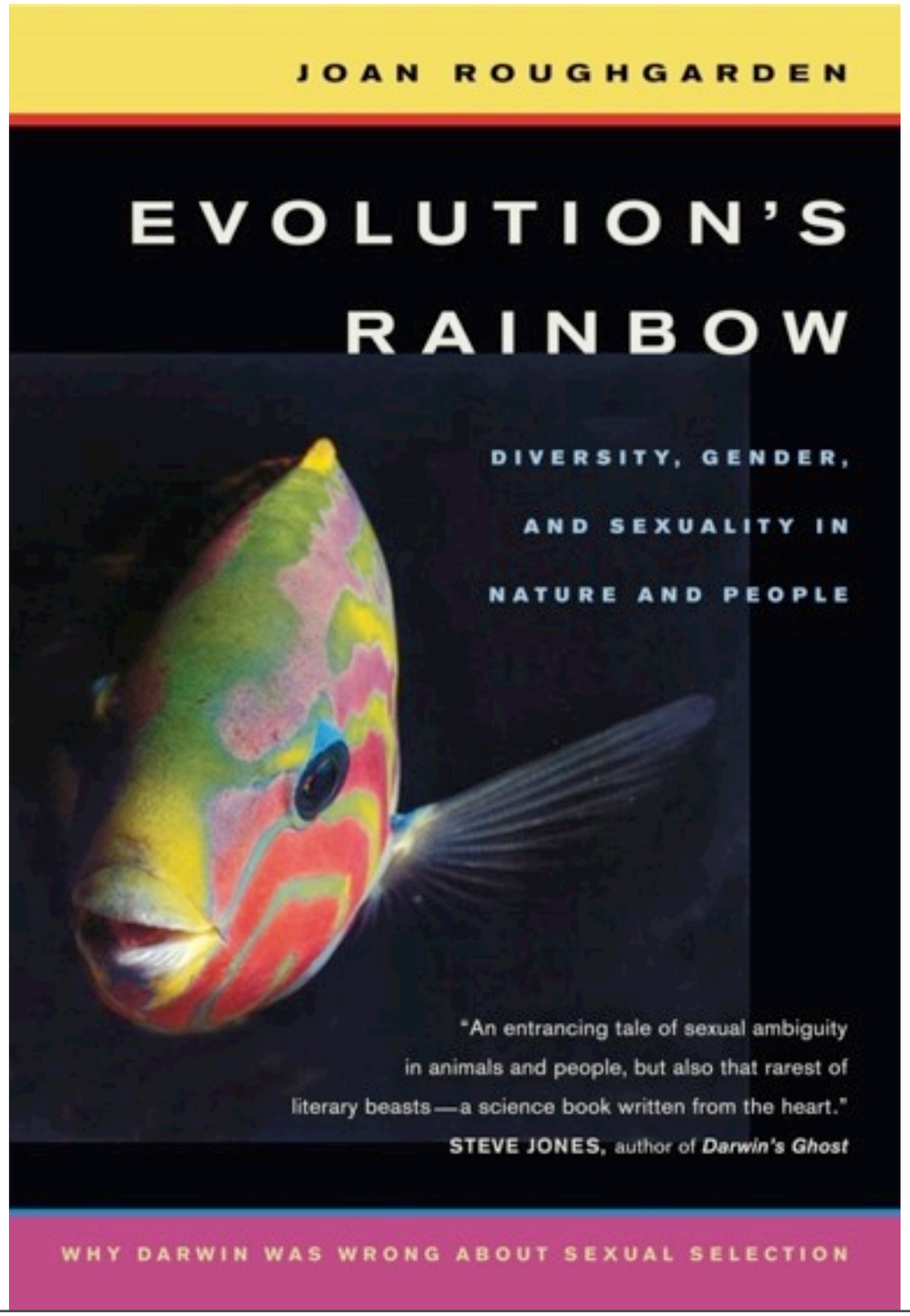
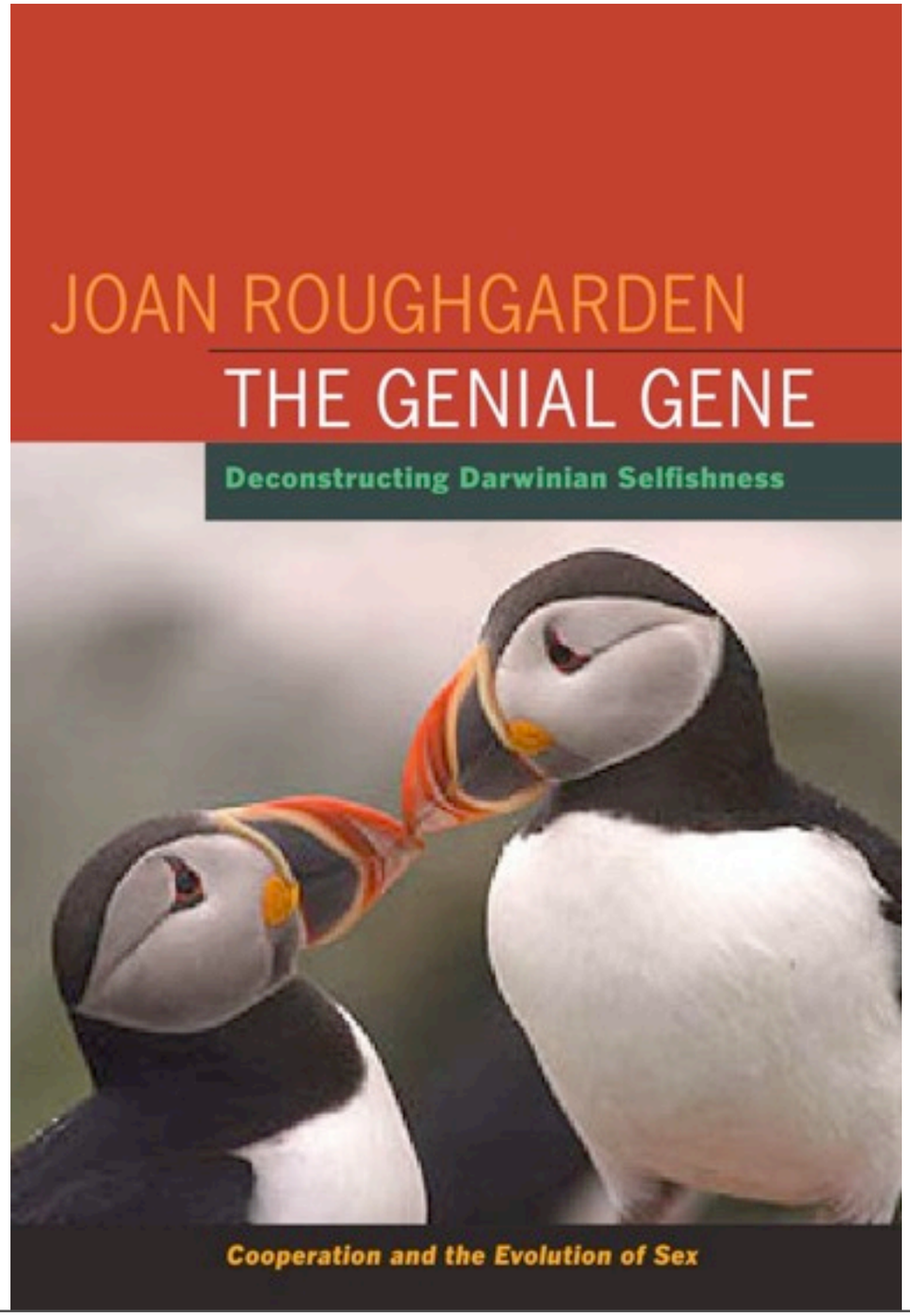




``The family is now perceived as a cauldron of conflict, with each of the players having different interests... sexual conflict, parent-offspring conflict, and sib-competition simultaneously.''

-- Parker, G. A. 2006. Behavioural ecology: the science of natural history. Pp. 23--56 in: *Essays on Animal Behaviour: Celebrating 50 Years of Animal Behaviour* (ed. J. R. Lucas and L. W. Simmons), Amsterdam: Elsevier.

``a primitive form of sexual conflict may have occurred during the early evolution of anisogamy.''

-- Parker, G. A. 2006. Sexual conflict over mating and fertilization: an overview. *Phil. Trans. R. Soc.* B 361:235--259

``There has been a dramatic shift in the prevailing view of matings as being essentially `a good thing' for both participants, to one in which they are regarded as `bad' for females." Previous views are ``mistakenly viewing male-female interactions as more benign than they actually are.''

-- Tregenza, T., N. Wedell, and T. Chapman. 2006. Introduction. Sexual conflict: a new paradigm? *Phil. Trans. R. Soc.* B 361:229-–234.

``a conflict of interest exists, with each parent preferring the other to work hard.''

--J. McNamara, C. Gasson, and A. Houston, 1999. "Incorporating Rules for Responding into Evolutionary Games," *Nature* 401: 368–371.

``resolution does not in any real sense make sexual conflict disappear or even fade. There is no solution to sexual conflict''

--Arnqvist, Goran, and Locke Rowe. 2005. *Sexual Conflict*. Princeton University Press.

``Monogamy is one the most puzzling of mammalian mating systems, for it is not clear why males should confine themselves to breeding with a single female.''

-- Clutton-Brock. T. 1989. Review lecture: Mammalian mating systems. *Proc. R. Soc. Lond.* B. 236:339--372.

``Parent-offspring conflict can arise because some actions that advance the fitness of an offspring can potentially reduce the lifetime success of the parent just as some actions that benefit parental fitness can reduce the lifetime fitness of a particular offspring... we might expect each offspring to want to extract more than its own share of parental investment.''

--Salmon, Catherine. 2005, Parental investment and parent-offspring conflict. Chapter 17, pp. 506--527 in: Buss, David. 2005 *The Handbook of Evolutionary Psychology*, Wiley, p. 514.

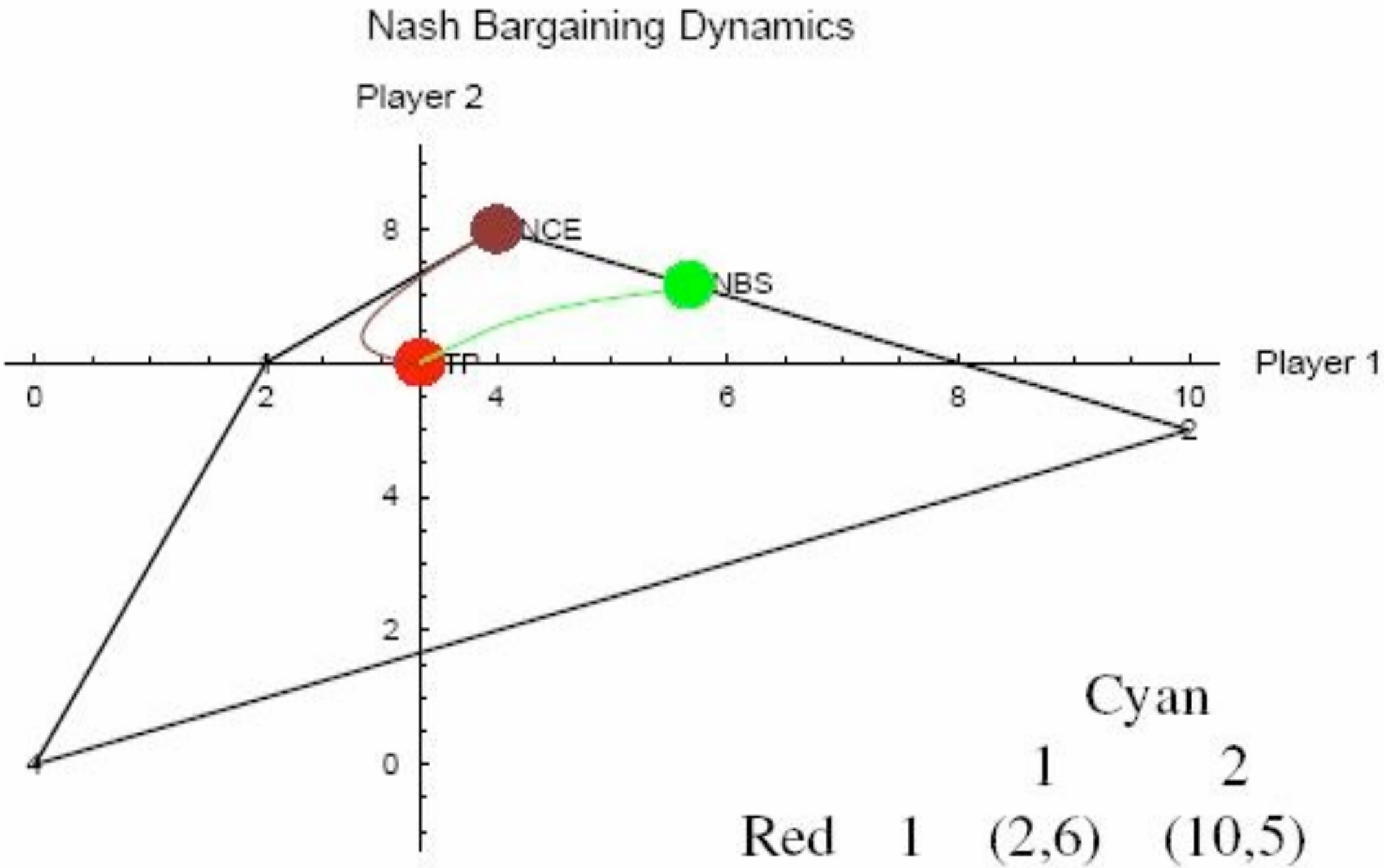
Two-Tier Setup

Behavioral Tier:

Fast Competitive or Cooperative Play in Developmental Time

Evolutionary Tier:

Slow Population-Genetic Change in Evolutionary Time

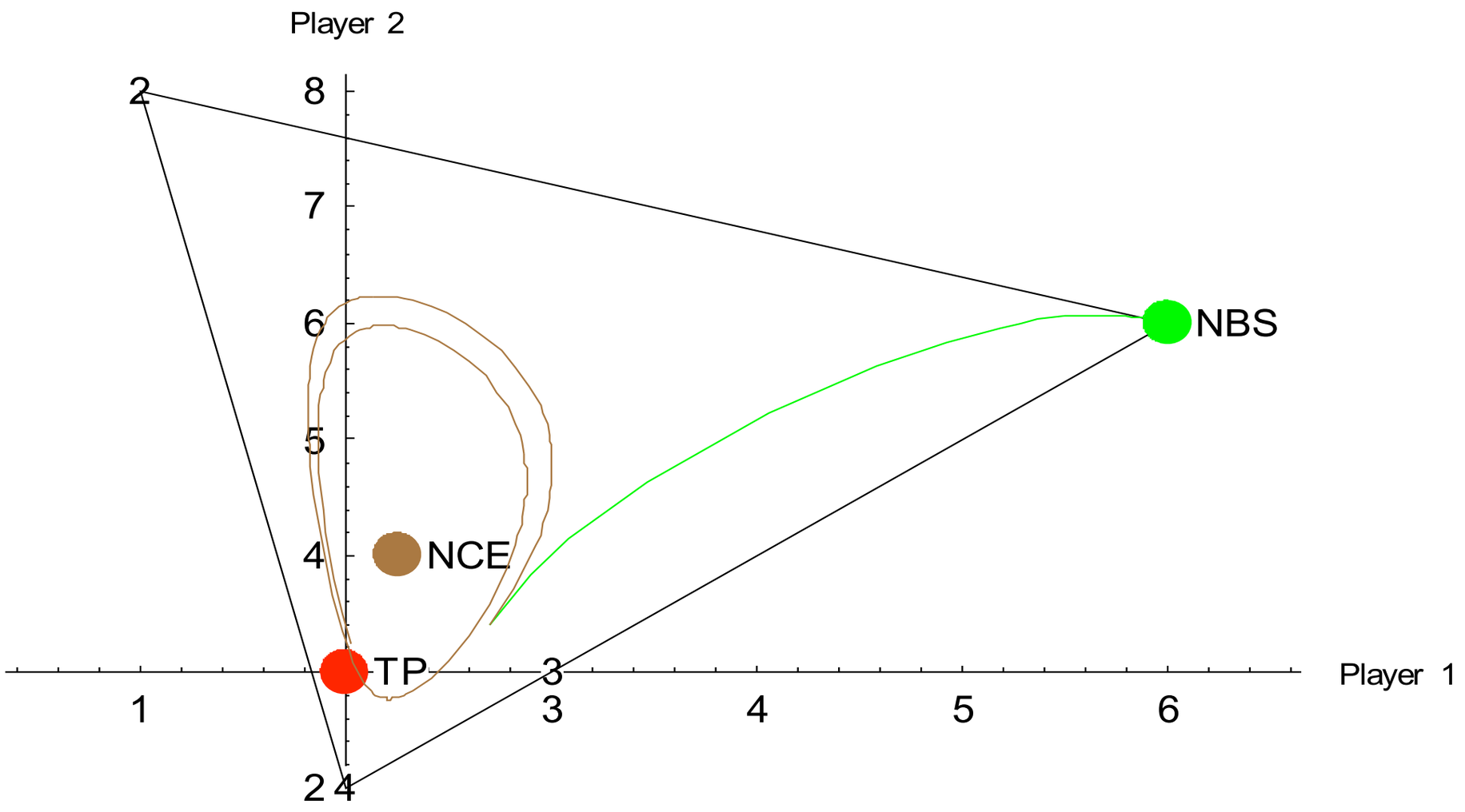


		Cyan 1	Cyan 2
Red	1	(2,6)	(10,5)
	2	(4,8)	(0,0)

Formation of Social Monogamy

		Female	
		Share Nestling Access	Control Nestling Access
Male	Help at Nest	(6,6)	(1,8)
	Abandon Nest	(3,3)	(2,2)

Nash Bargaining Dynamics



Parent-Offspring Relationship in Evolutionary Theory

Offspring Control

Trivers 1972,1974

Parker&Macnair 1978,1979

Parker 2002

Offspring-Scramble Models

X

Invasible by Random Allocating Parent

Parental Control

Alexander 1974

Signaling Theory

Grafen, Godfray, Johnstone 1990's

Honest Parent-Offspring Signaling Models

Incentive Theory

Roughgarden 2010

Family Firm

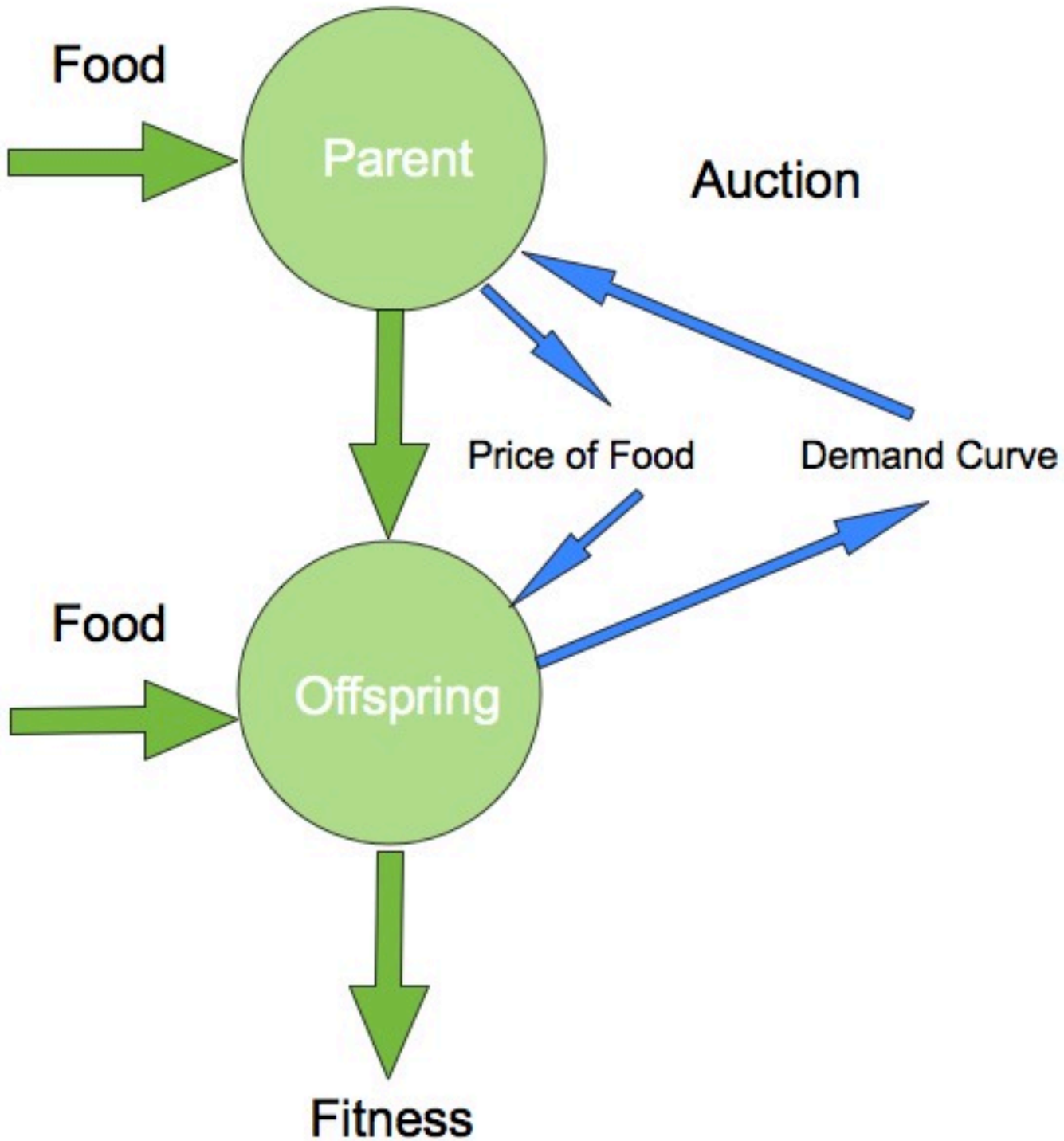
Walrasian Auction of
Food From Parent to Offspring

Social Selection Perspective

Single Evolutionary Tier,
Evolutionarily Stable Strategy Solution

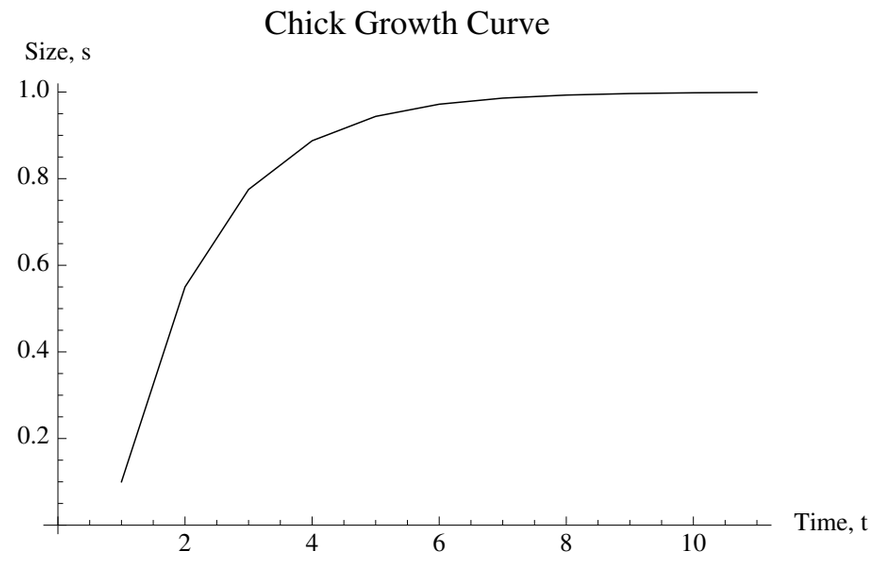
Behavioral/Evolutionary Tiers,
Incentive Compatibility Solution

Parent-Offspring Firm



Groves, T. 1973, Incentives in Teams,
Econometrica 41:617–631.

$$\Delta s = g(s_m - s)$$



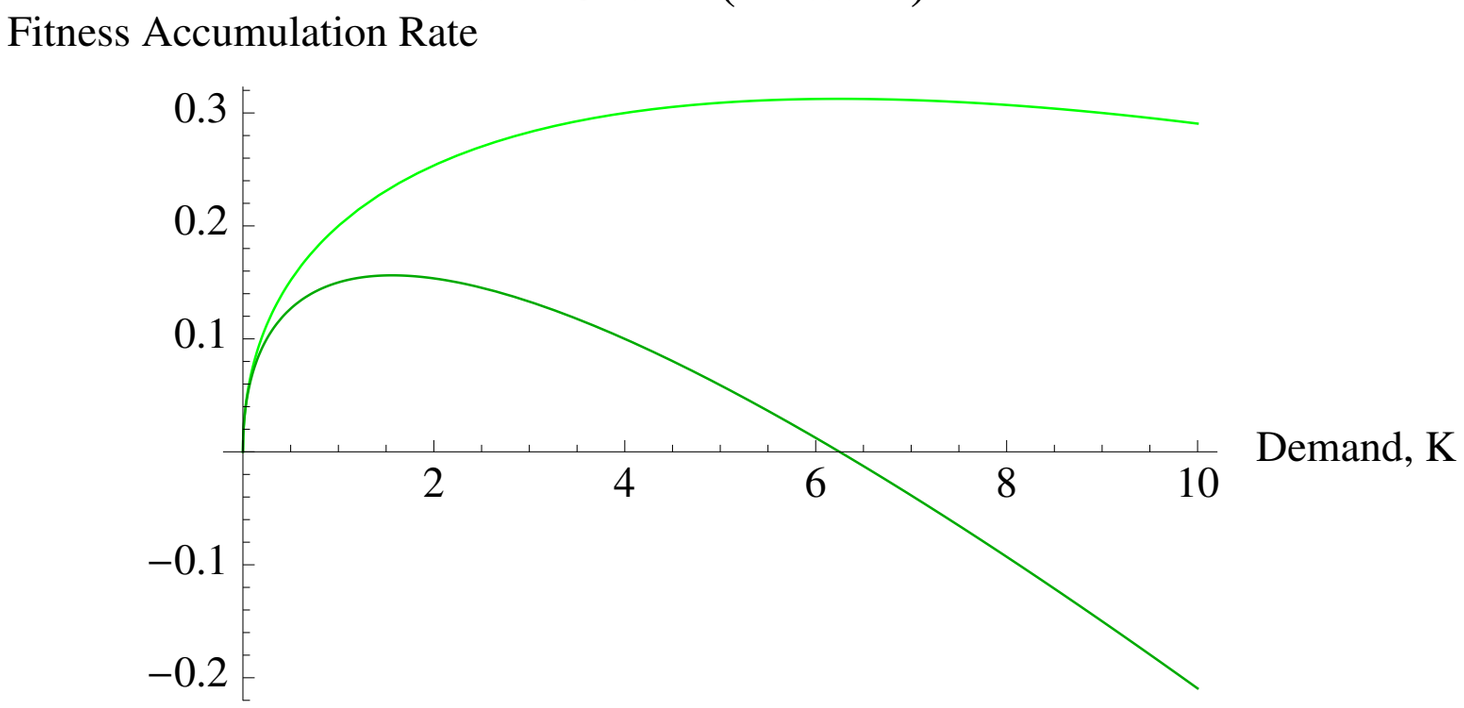
$$\Delta W = a(\Delta s)$$

$$g = bK^c$$

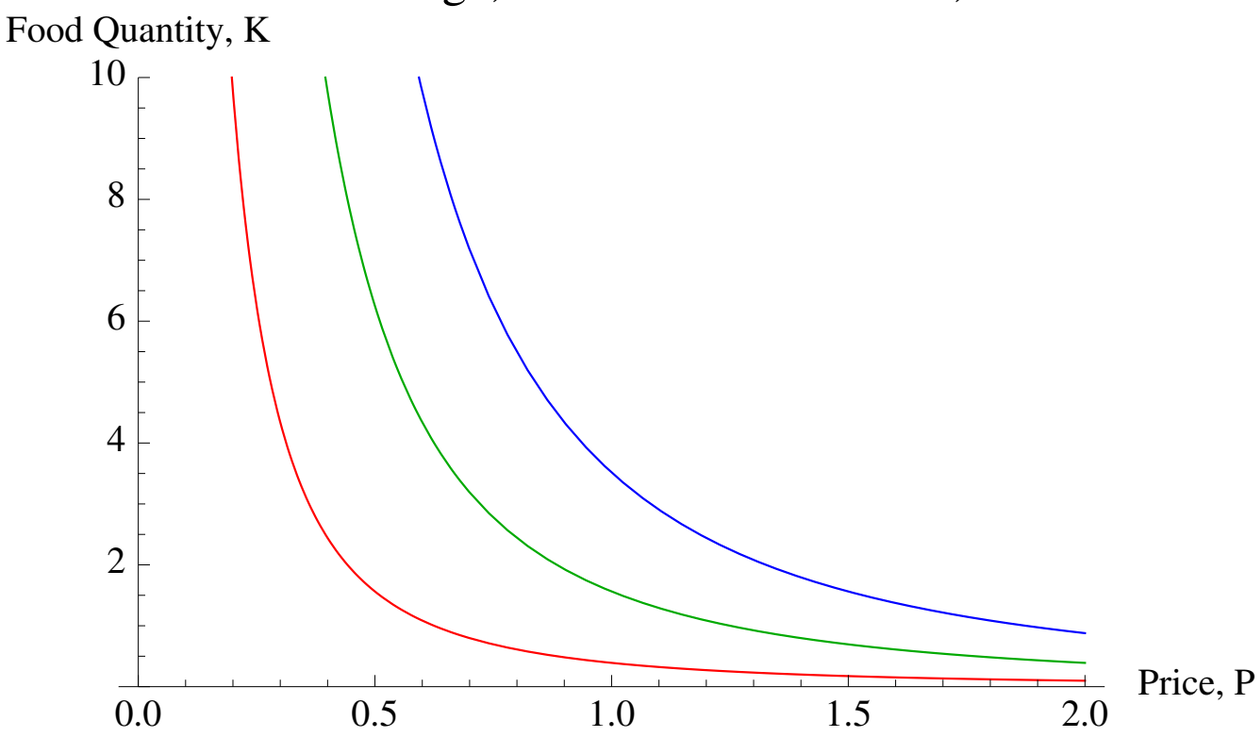
$$\begin{aligned} f(K, L(s)) &= abK^c L(s) - adPK \\ &= a(bK^c L(s) - dPK) \end{aligned}$$

$$L(s) \equiv (s_m - s)$$

Chick Fitness Production Function, Medium Size Chick
Price of Food: Light Green (Top) = 0.5,
Dark Green (Bottom) = 1



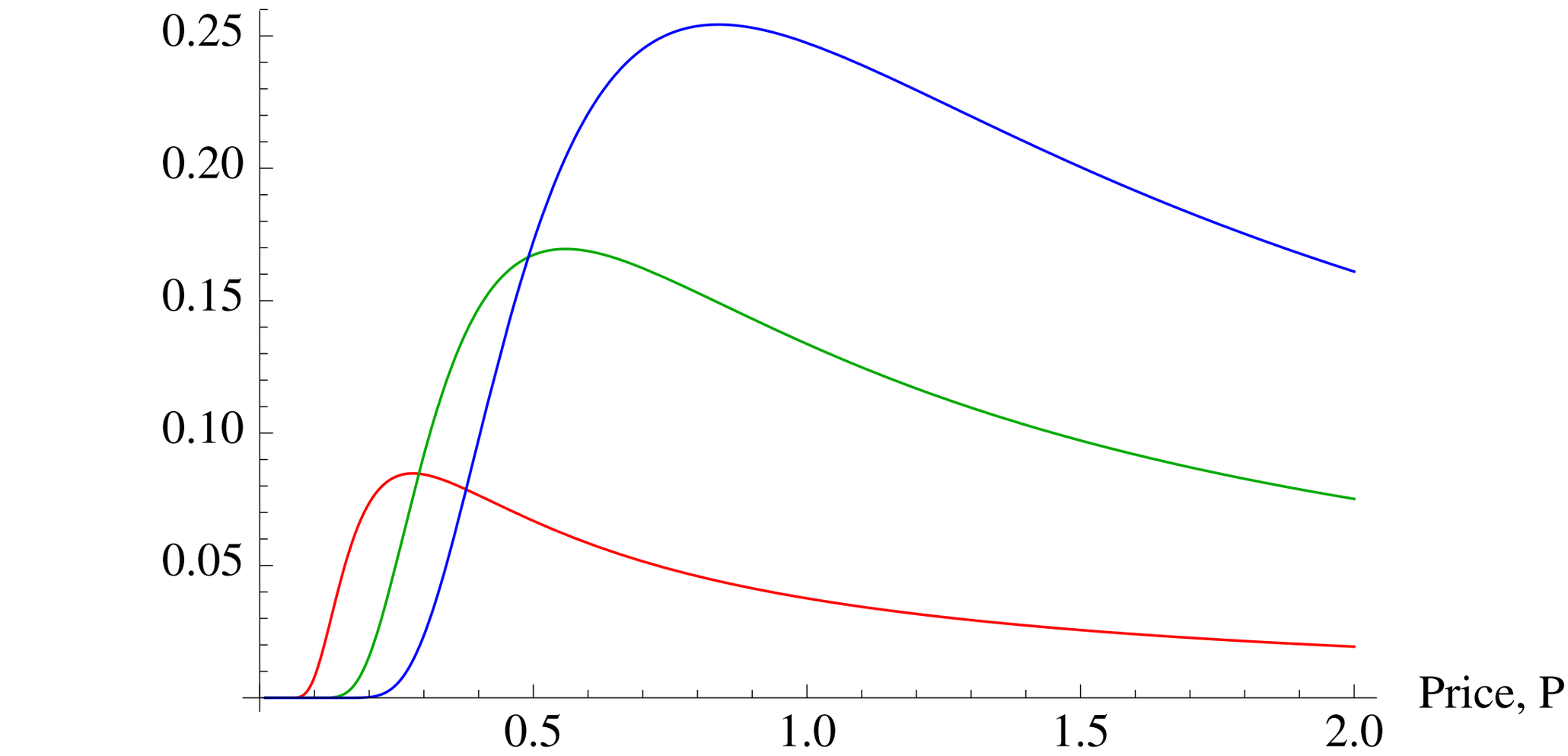
Chick Optimal Demand Curves
Chick Size: Red=Large, Dark Green=Medium, Blue=Small



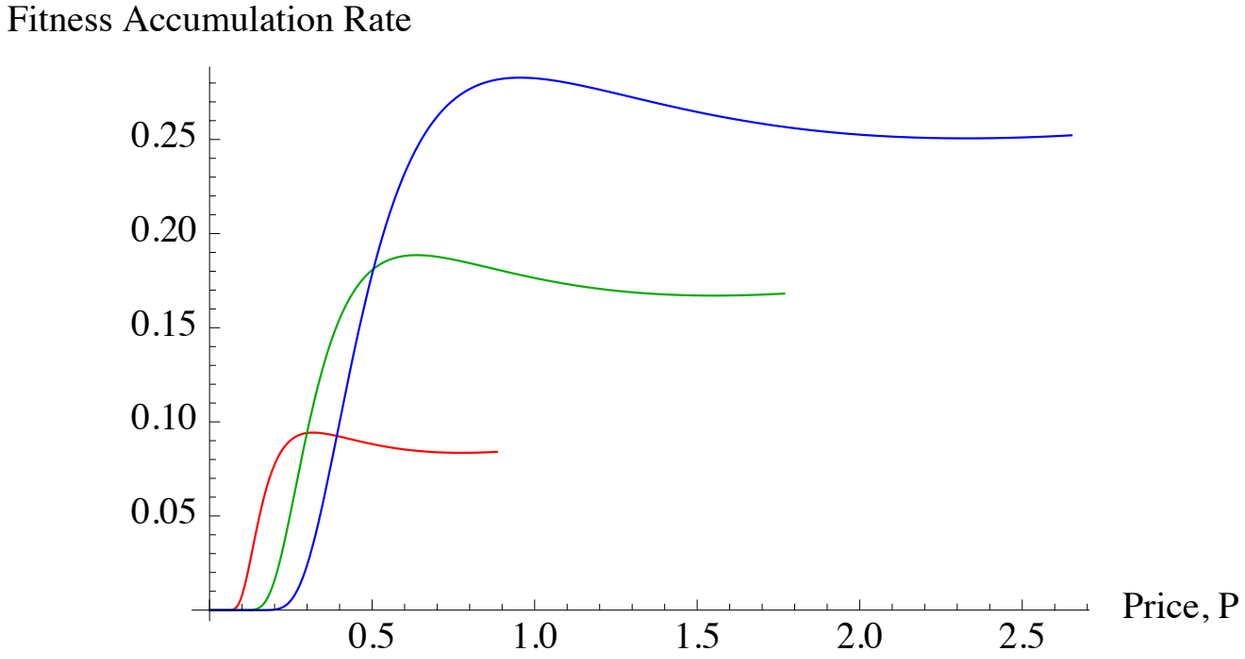
$$f_0(K, L(s)) = fe^{-hK} = (bK^c L(s) - pPK)e^{-hK}$$

Parental Fitness Production Function,

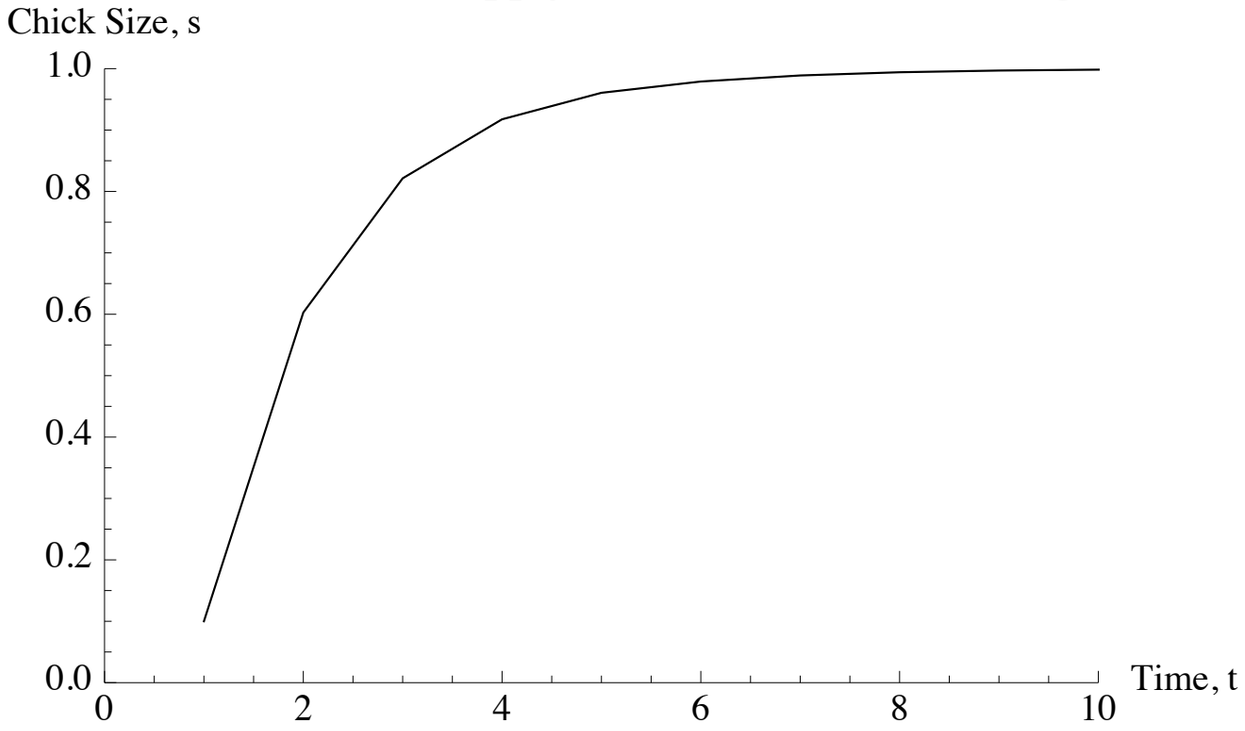
Chick Size: Red=Large, Dark Green=Medium, Blue=Small



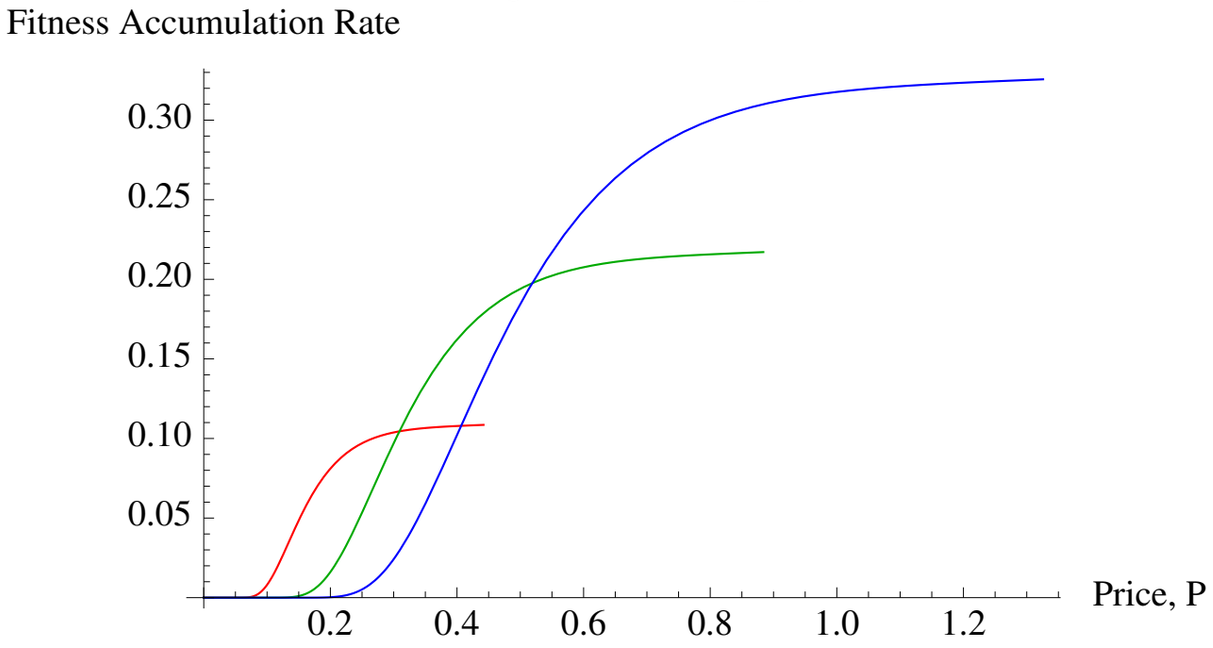
Parental Fitness Production Function,
Chick Size: Red=Large, Dark Green=Medium, Blue=Small
Self Feeding: Chick Supply, Kc = 0.5



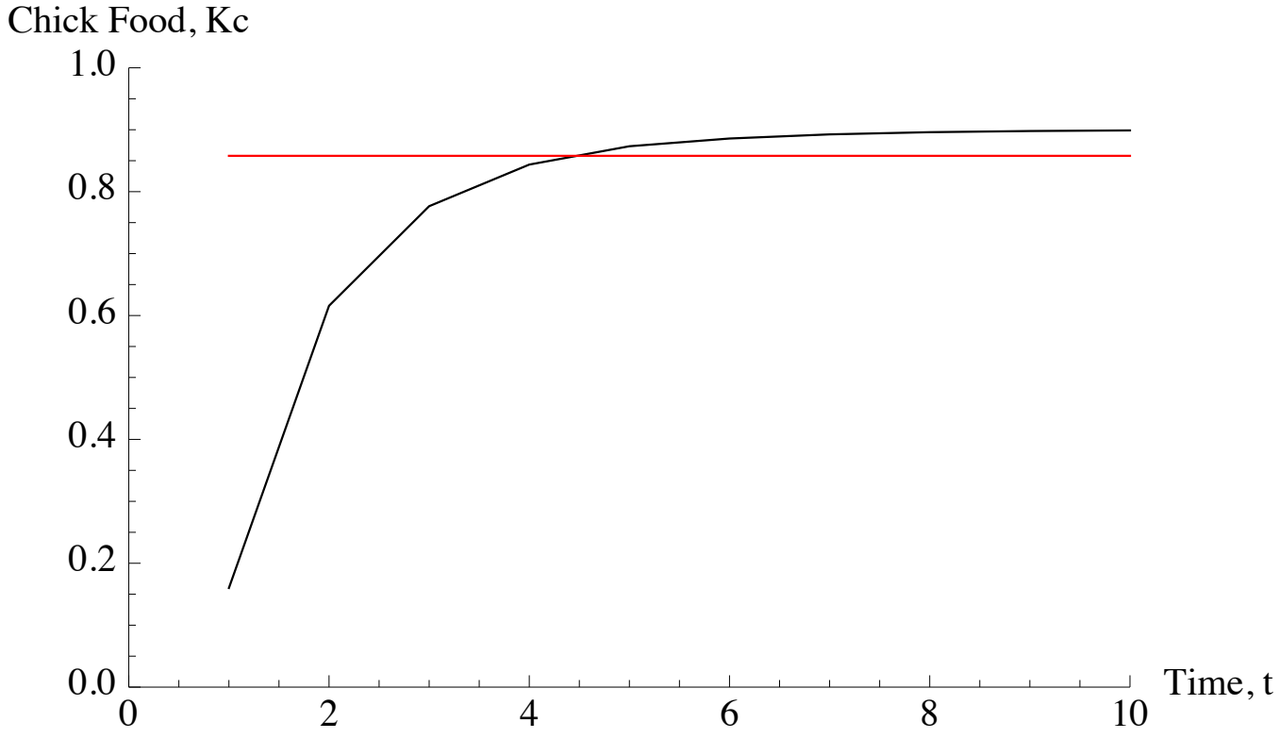
Chick Growth
Variable Food Supply With Chick Self Feeding



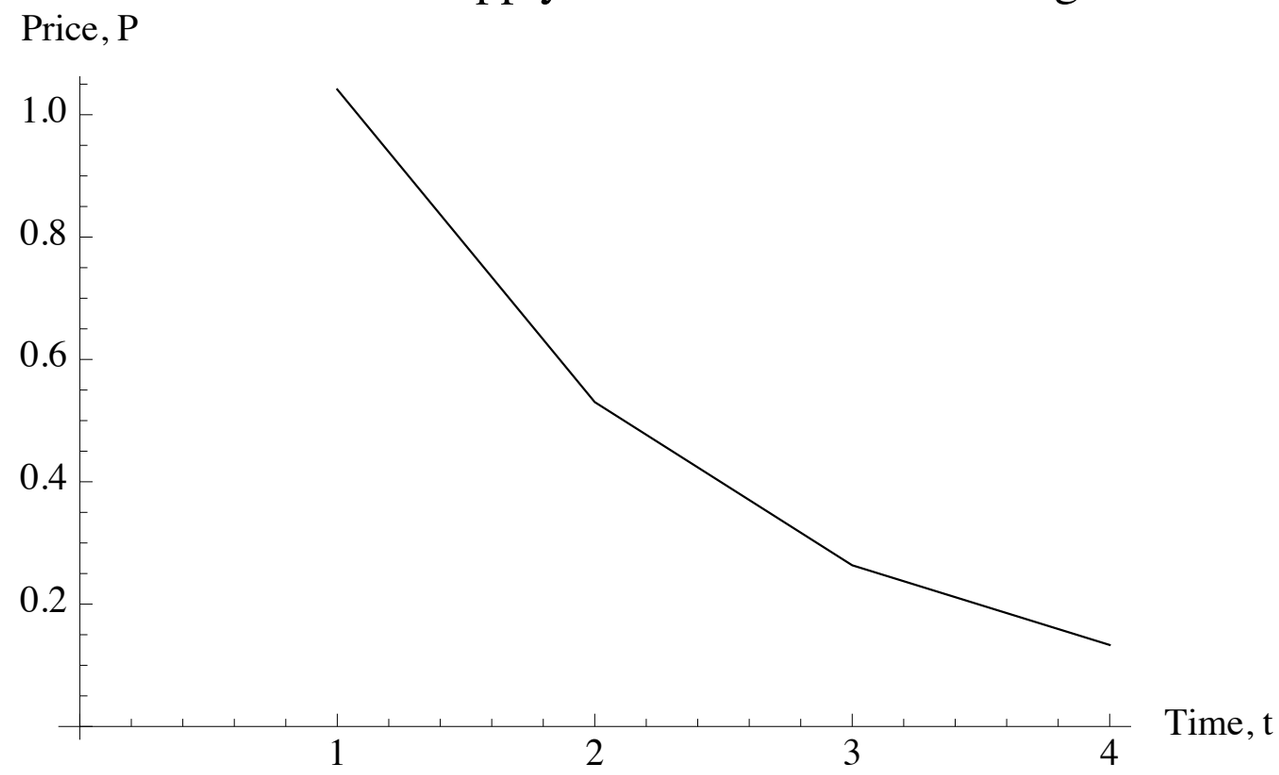
Parental Fitness Production Function,
Chick Size: Red=Large, Dark Green=Medium, Blue=Small
Self Feeding: Chick Supply, Kc = 2



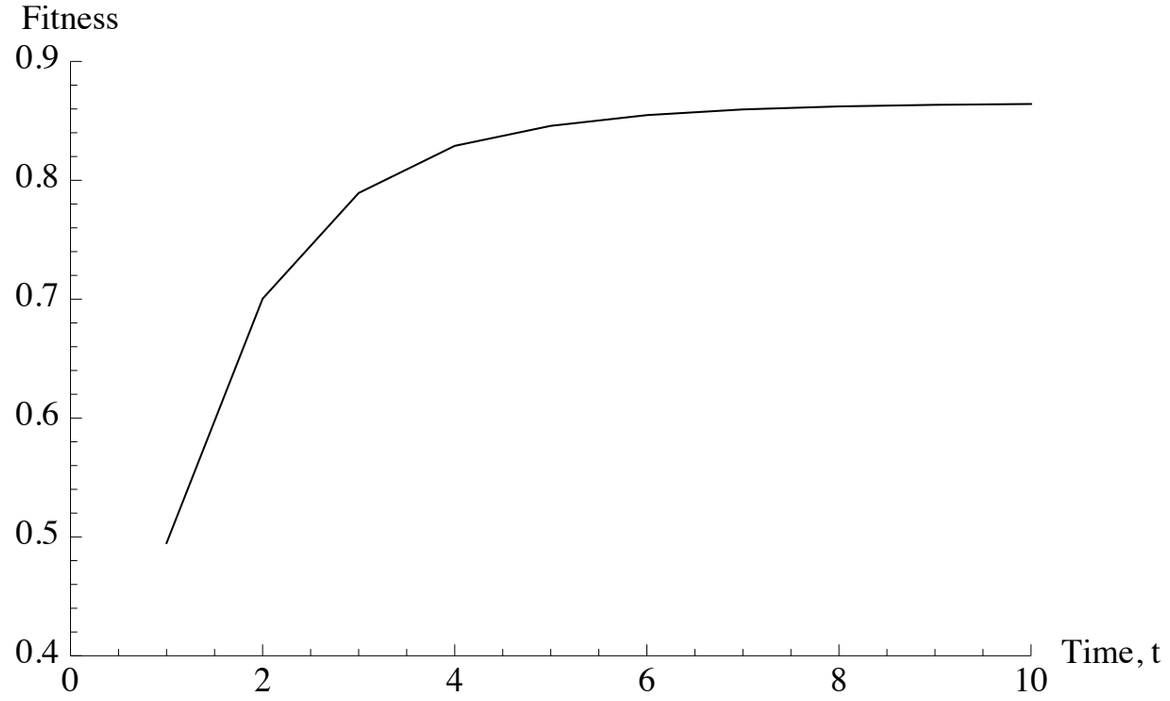
Chick Food Procured And Weaning Threshold
Variable Food Supply With Chick Self Feeding



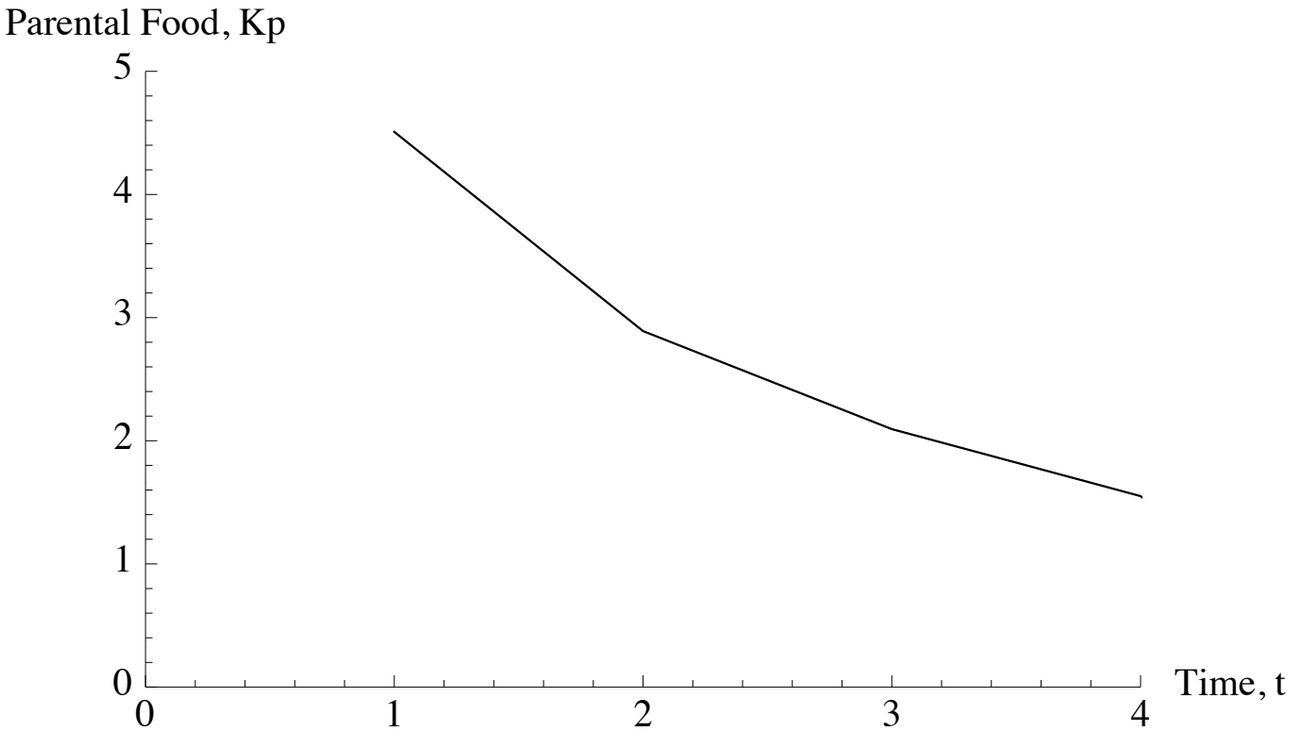
Price of Parental Food
Variable Food Supply With Chick Self Feeding



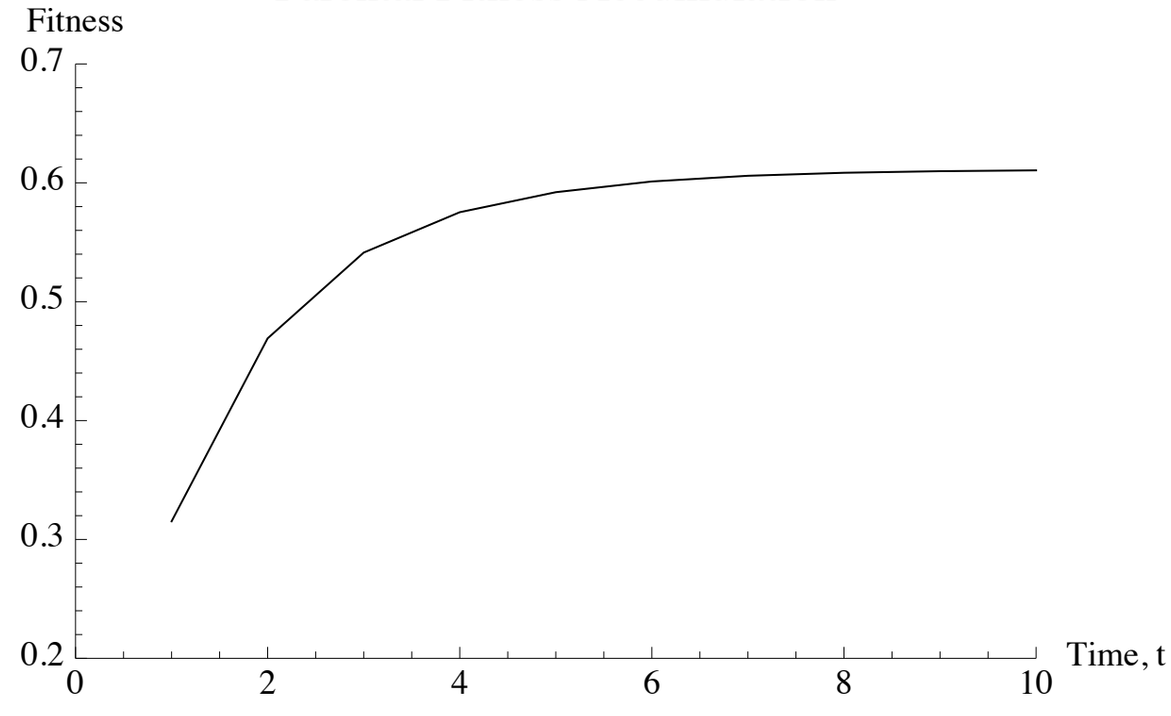
Chick Fitness Accumulation



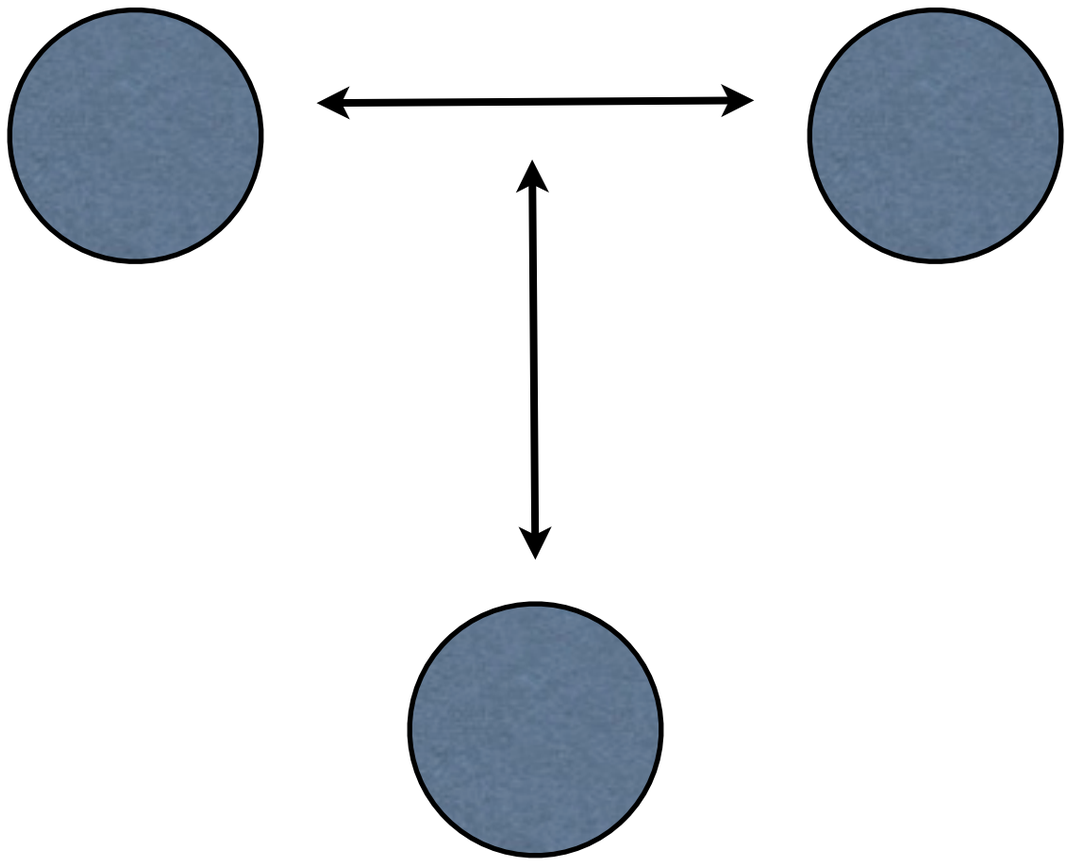
Parental Food Delivered at Supply=Demand
Variable Food Supply With Chick Self Feeding



Parental Fitness Accumulation



Parent-Parent Relationship:
Team-Play, Coordinated Action Toward Team Goal,
Physical Intimacy as Mechanism Producing
Nash Bargaining Solution to Resolve Genetic Conflict



Parent-Offspring Relationship:
Auction of Resources to Offspring
as Mechanism Producing Incentives
to Resolve Genetic Conflict

Evolutionary System of Sex, Gender and Sexuality

Origin Of Sexual Reproduction

Origin of Male-Female Binary

Modeling Social Systems---Number Of Tiers.

Central Narrative Of Male/Female Mating Objectives

Secondary Sex Characters, Ornaments and Armaments

Contradictions To Sexual-Selection, Sex Role Reversal

Narratives For Sex/Gender Diversity

Family Dynamics: Parent-Parent and Parent-Offspring

Application To Humans

Collaborators

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