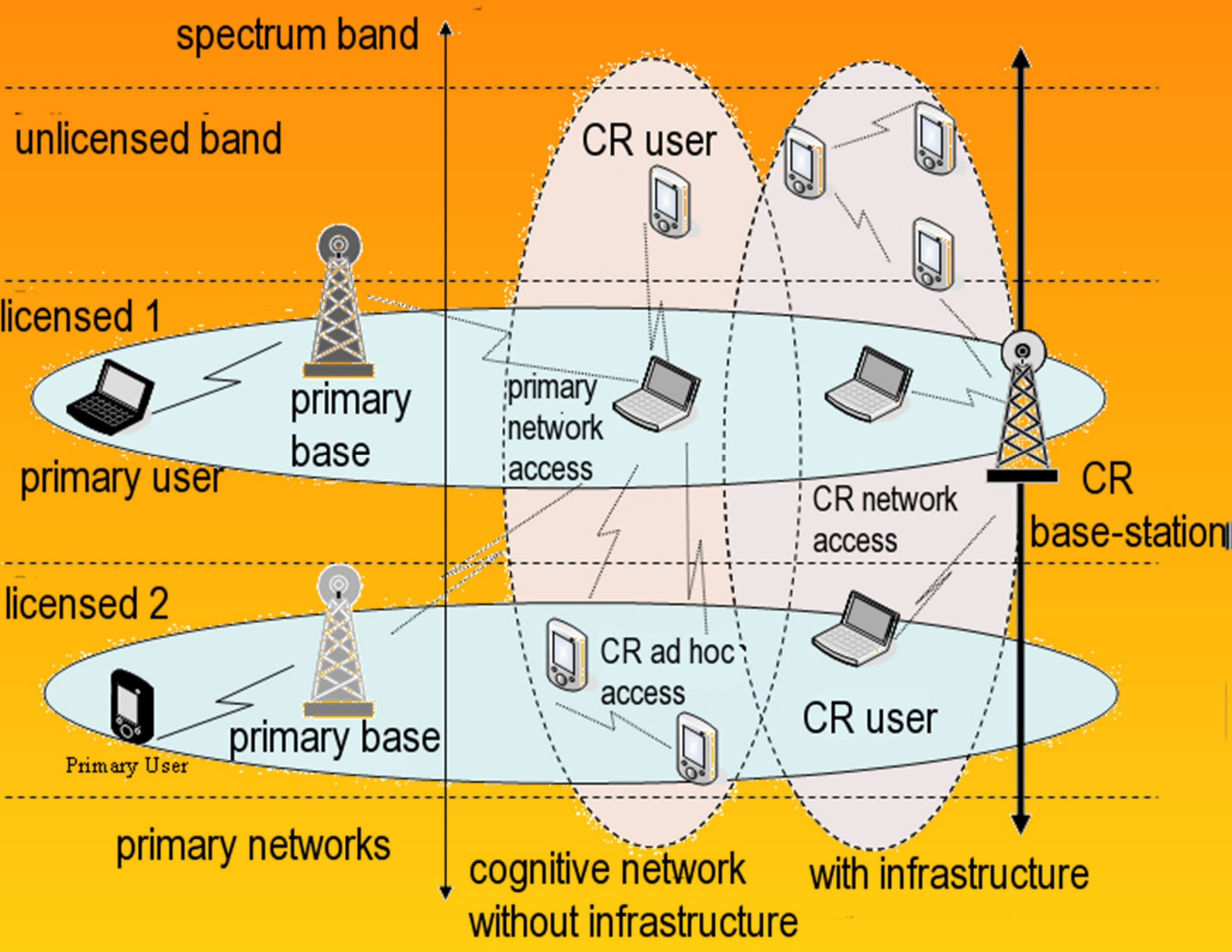


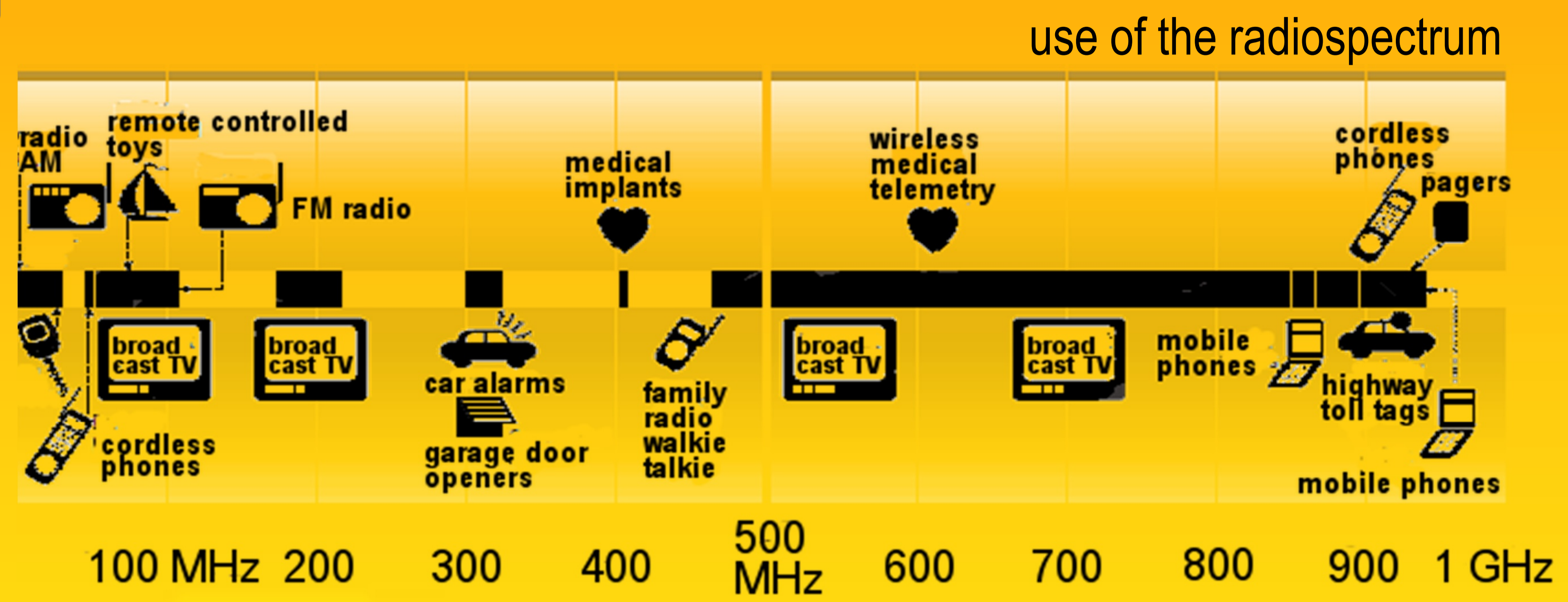
GAME THEORY – MODELING AND COMPUTATION



A^1, B^∞ (sensing)
 $A^1(DB), B^1, C^\infty$ (sensing)

cognitive radio

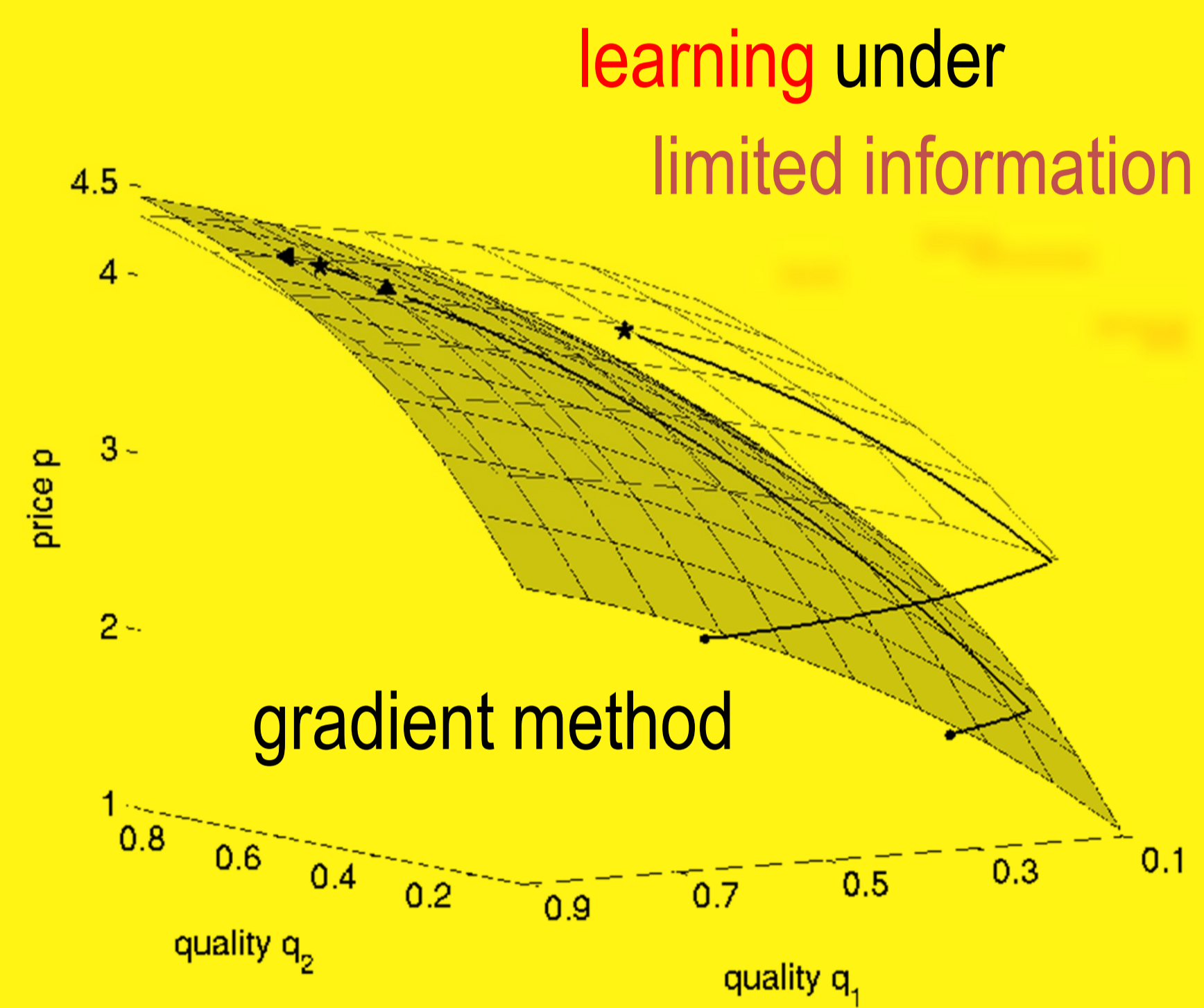
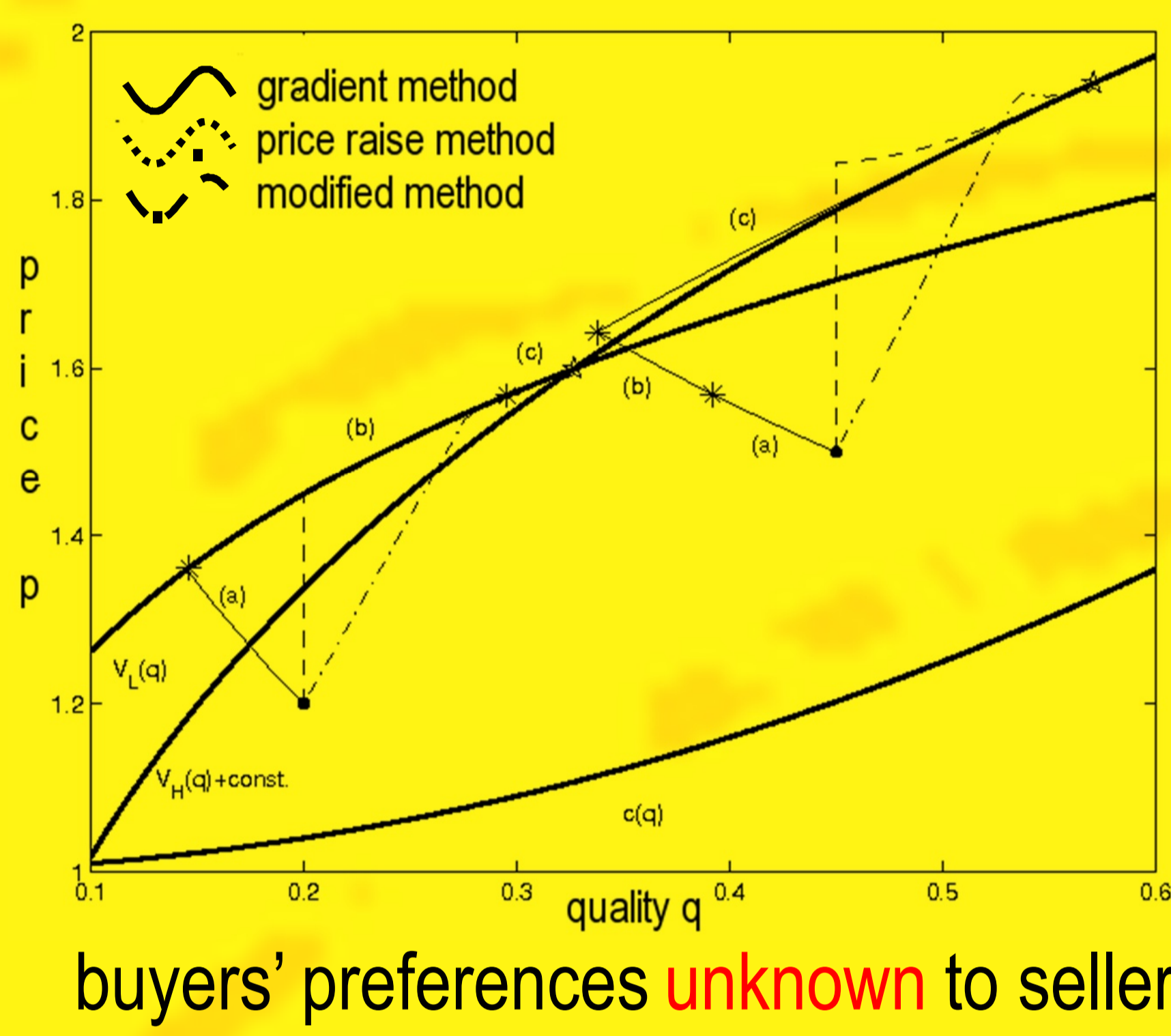
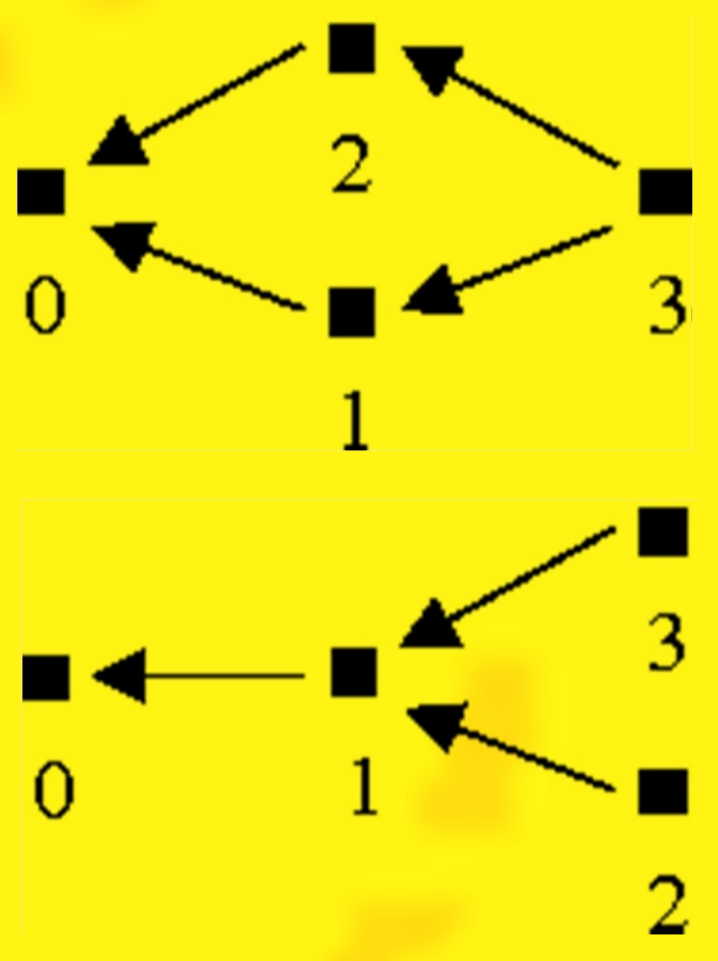
spectrum efficiency
 sensing technology
 flexible spectrum use



nonlinear pricing

application of mechanism design

digraphs of active Lagrange multipliers

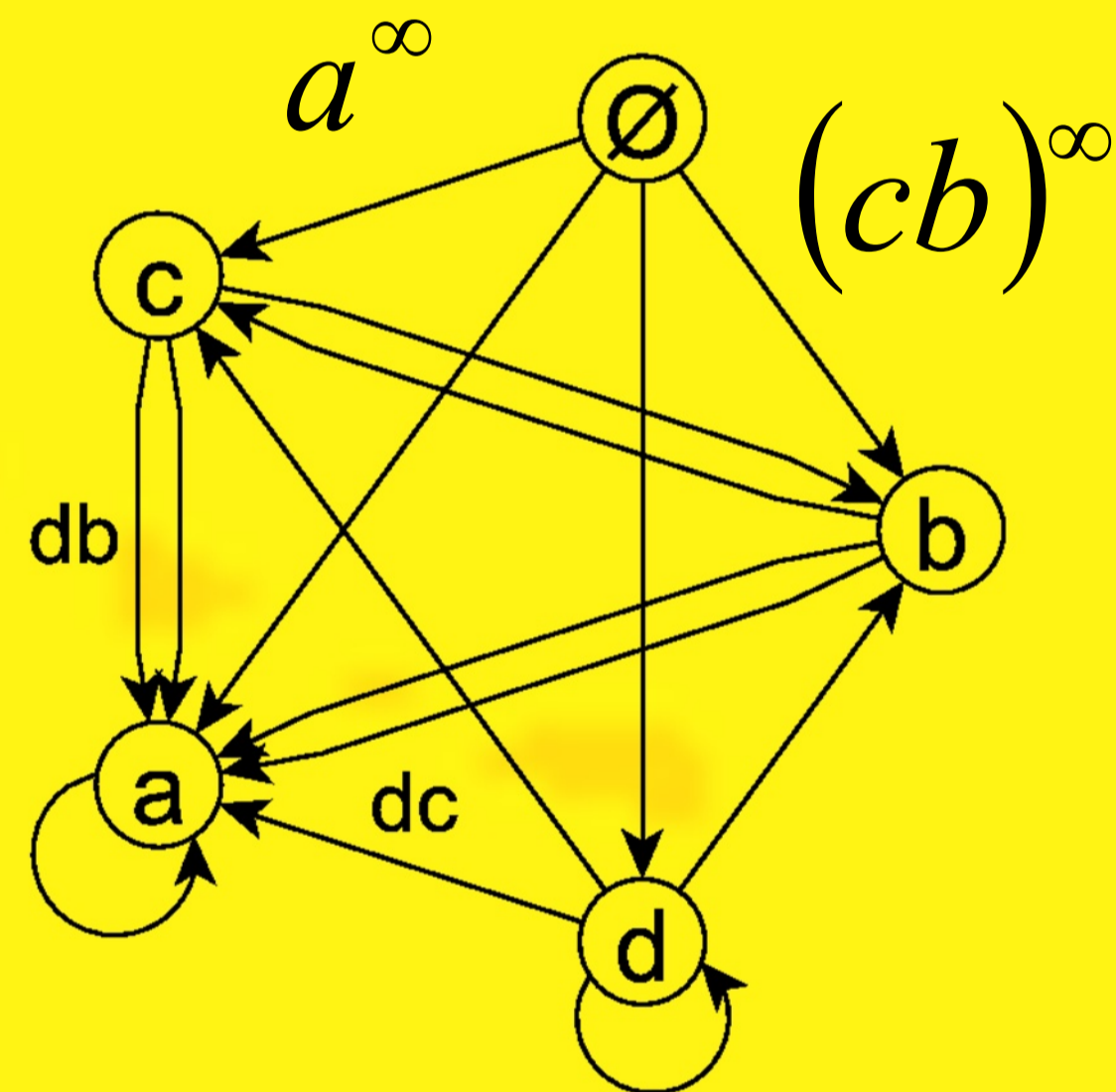


repeated games

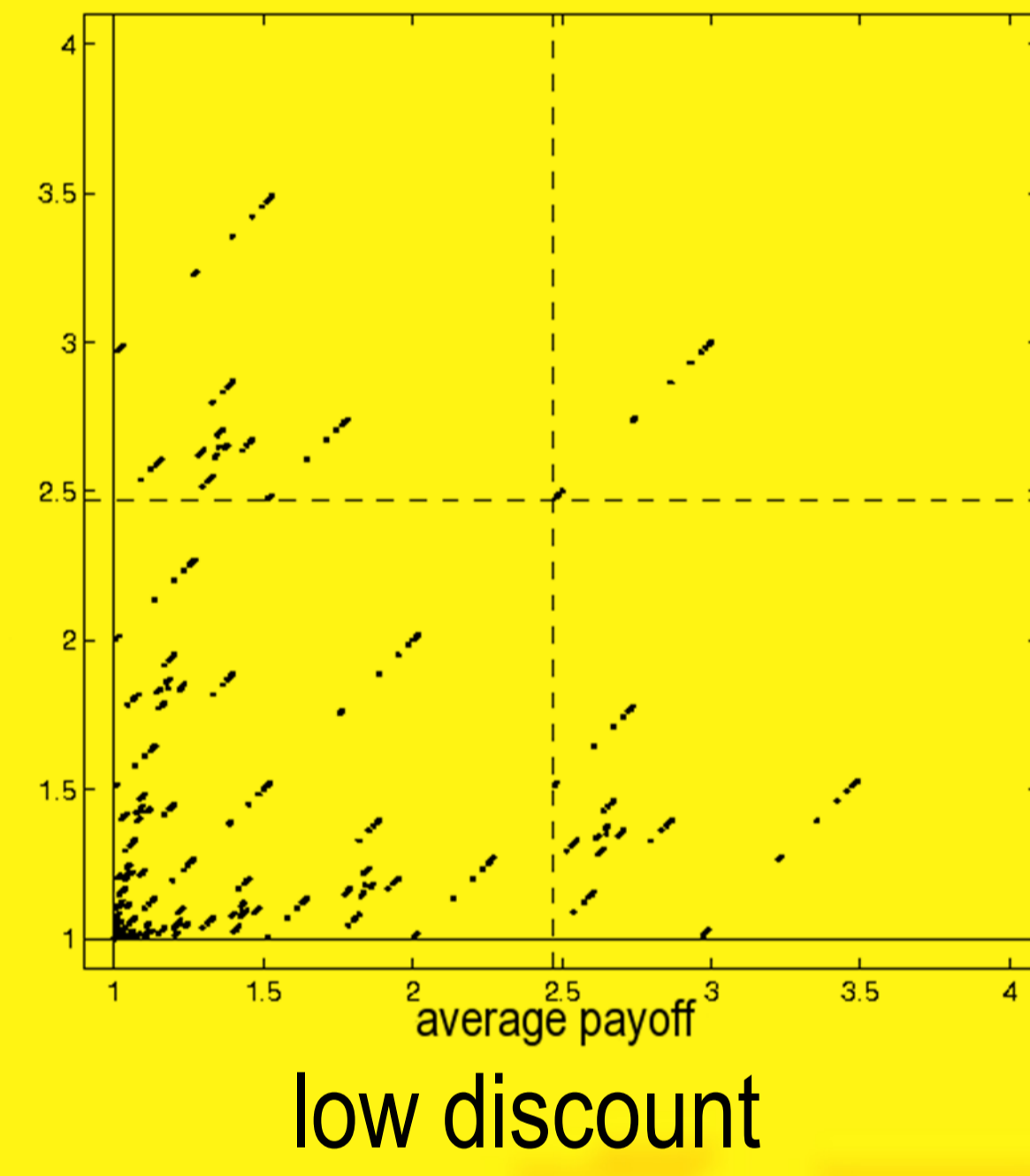
algorithms to compute strategies and payoffs

		prisoner B	
		confess	silence
prisoner A	confess	1, 1	4, 0
	silence	0, 4	3, 3

Prisoner's Dilemma (Tucker 1950)

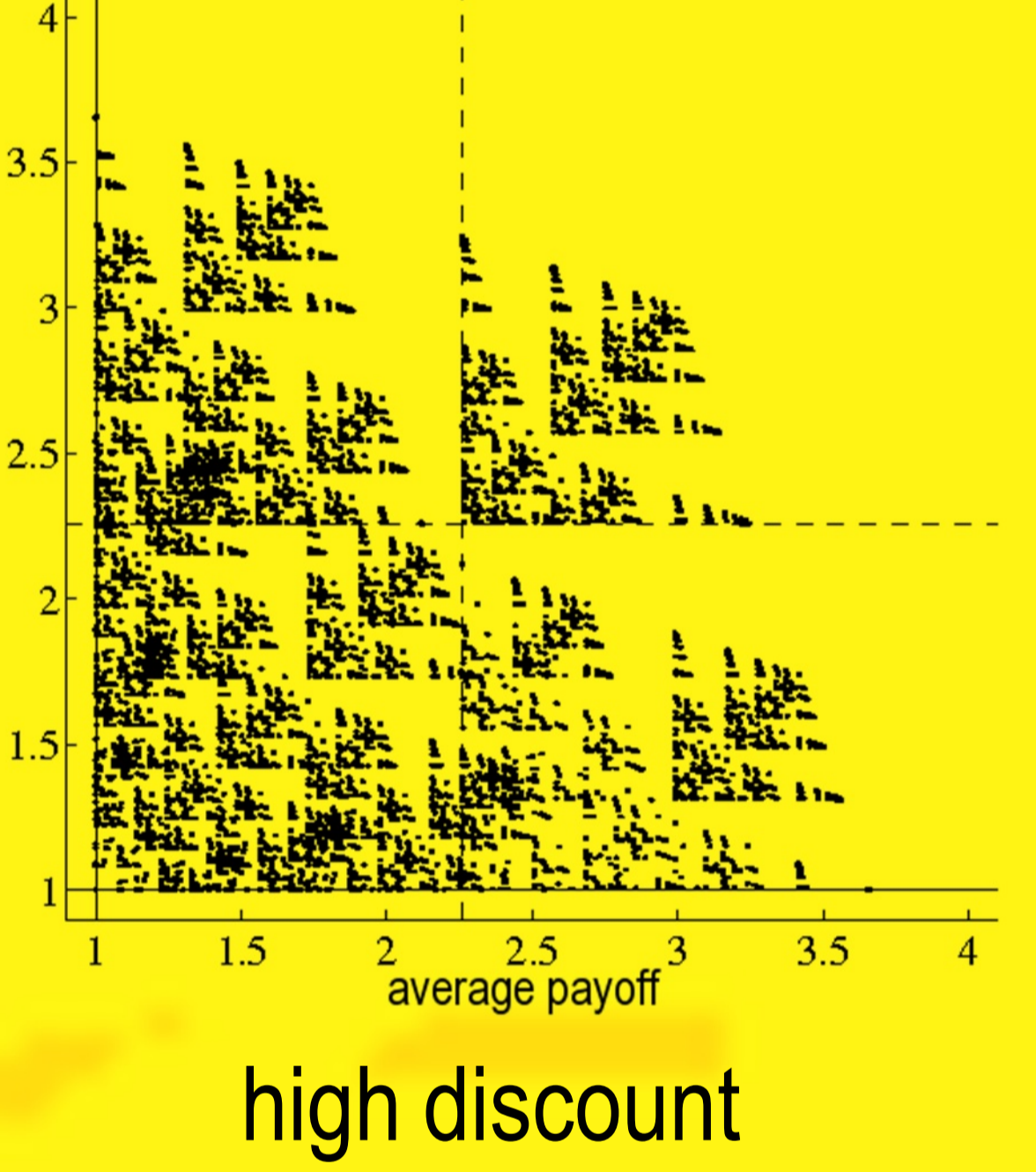


multidigraphs to represent equilibrium paths



low discount

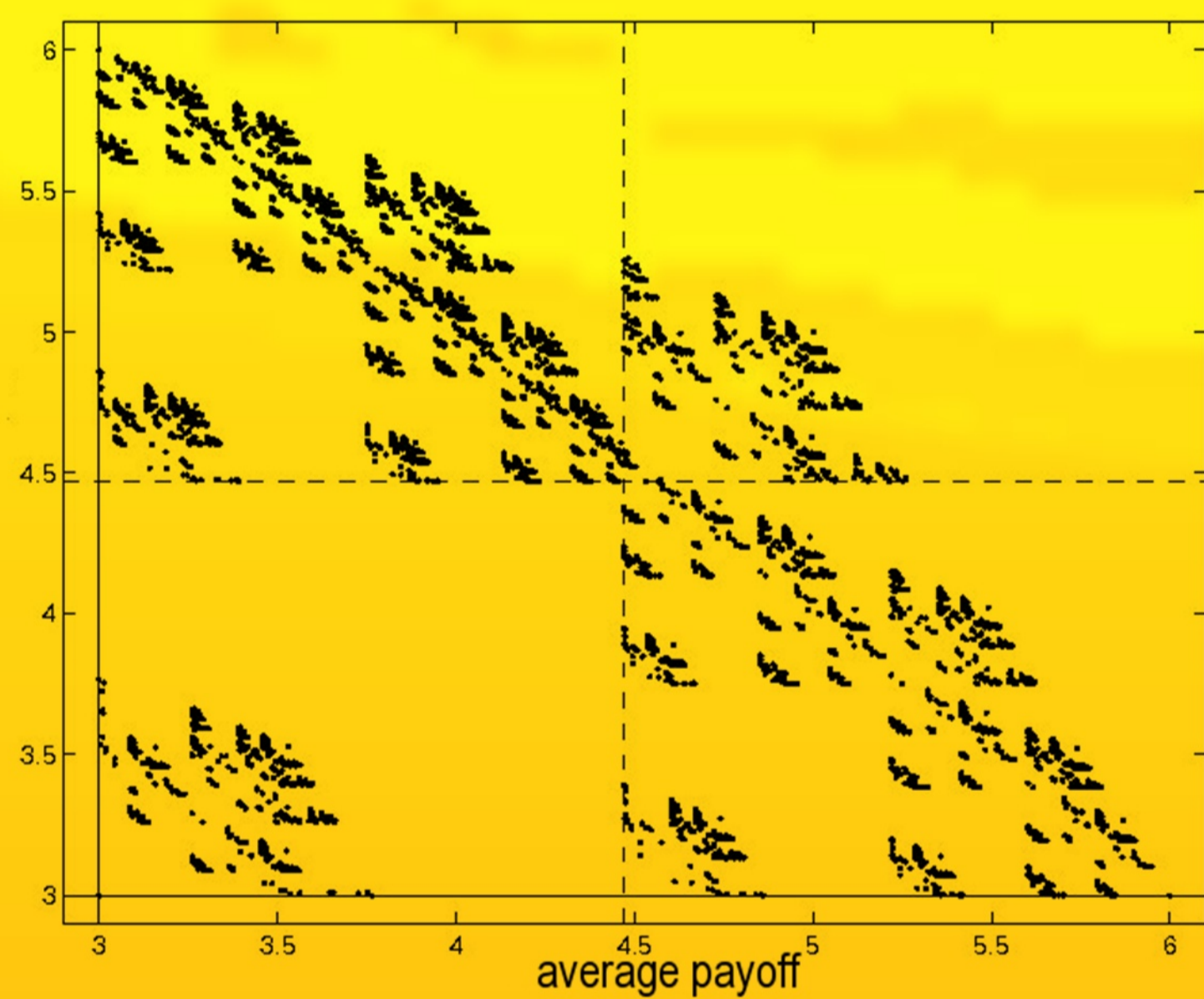
Hausdorff dimension increases
 more ways to cooperate



high discount

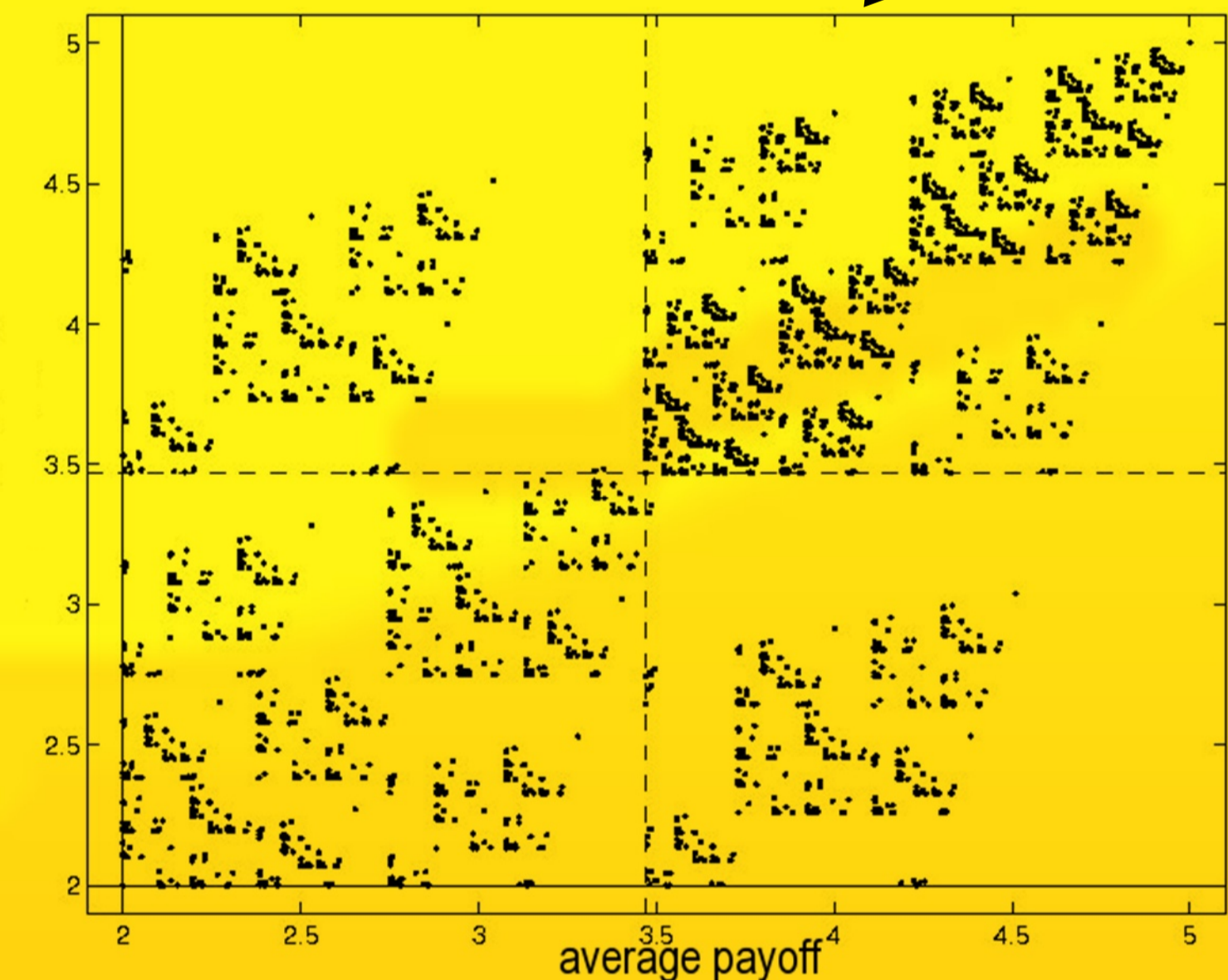
Hawk-Dove or Chicken (Russell 1959)
 anti-coordination game
 Cuban missile crisis 1962

	2, 2	6, 3
	3, 6	5, 5



Stag Hunt (Rousseau 1754)
 cooperation and coordination game

	5, 5	1, 4
	4, 1	2, 2



theory behind computational models

Nash Equilibrium, fixed point of best-response correspondence (Nash 1950); Incentive compatibility (Hurwicz 1972);

Subgame perfect equilibrium payoffs, fixed point of iterated function system (Abreu 1988);

Hausdorff dimension to digraphs (Mauldin and Williams 1988); Fractals by iterated function systems (Hutchinson 1981)

selected publications

- K. Berg, H. Ehtamo, M.A. Uusitalo, and C. Wijting: Priority-based classification of spectrum access models. *IEEE Communications Mag.*, 2013
- K. Berg, M.A. Uusitalo, and C. Wijting: Spectrum access models and auction mechanisms. *IEEE International Symposium on Dynamic Spectrum Access Networks (DYSPAN)*, 2012
- K. Berg and G. Schoenmakers: Construction of randomized subgame-perfect equilibria in repeated games. *Manuscript*, 2014
- K. Berg, J. Flesch, and F. Thuijsman: Golden and silver ratios in bargaining. *Manuscript*, 2014
- K. Berg and M. Kärki: How patient the players need to be to get all the relevant payoffs in the symmetric 2x2 supergames? *Manuscript*, 2014
- K. Berg and M. Kitti: Fractal geometry of equilibrium payoffs in discounted supergames. *Fractals*, 2014
- K. Berg and M. Kitti: Computing equilibria in discounted 2x2 supergames. *Computational Economics*, 2013
- K. Berg: Complexity of solution structures in nonlinear pricing. *Annals of Operations Research*, 2013
- K. Berg and H. Ehtamo: Learning in nonlinear pricing with unknown utility functions. *Annals of Operations Research*, 2009
- K. Berg and H. Ehtamo: Multidimensional screening: online computation and limited information. *10th Int. Conf. on Electronic Commerce*, 2008