William Clifford-Brown

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Trieste, Italy
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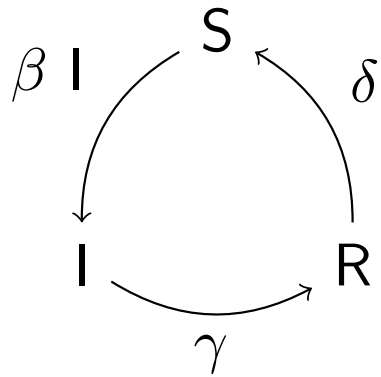
My Background

University of Manchester englishuknorth.com

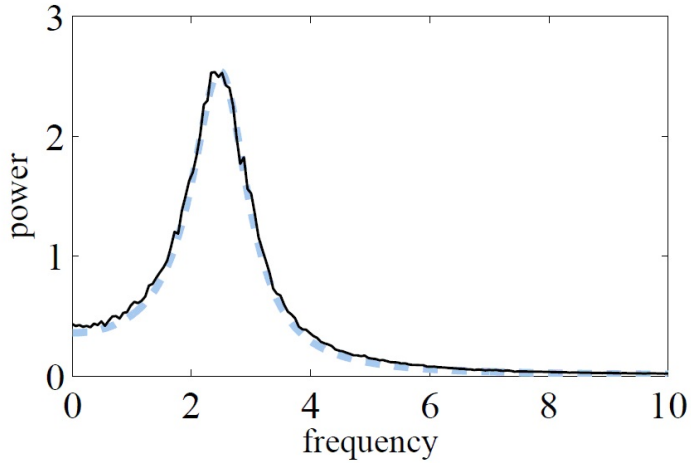
Previous Research

Masters Project

- SIRS model of epidemics
- Adaptive network
- Frequency power spectrum
- J. Stat. Mech. (2012) P08018



SIRS Model



Project Goals

Financial and socio-economic systems

- Optimal strategies in illiquid markets
- Systematic financial risk
- Inference using machine learning

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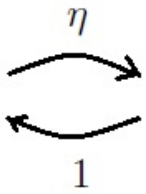
Work so far...

Resource Allocation - Two Birds



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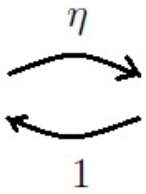
Resource Allocation - Two Birds



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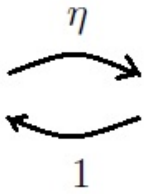

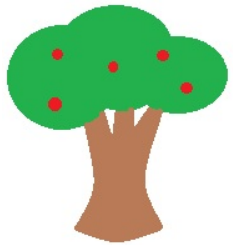

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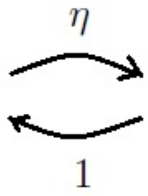
Resource Allocation - Two Birds



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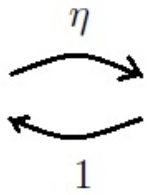

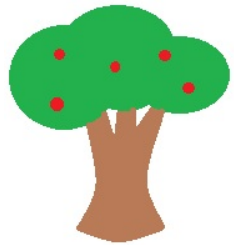

u_2

Expected payoff for bird i from going to site m

$$E[u_m] = u_m p(t_m^i, s_m^i) + (u_n - c)(1 - p(t_m^i, s_m^i))$$

where c is the cost for visiting an occupied site.

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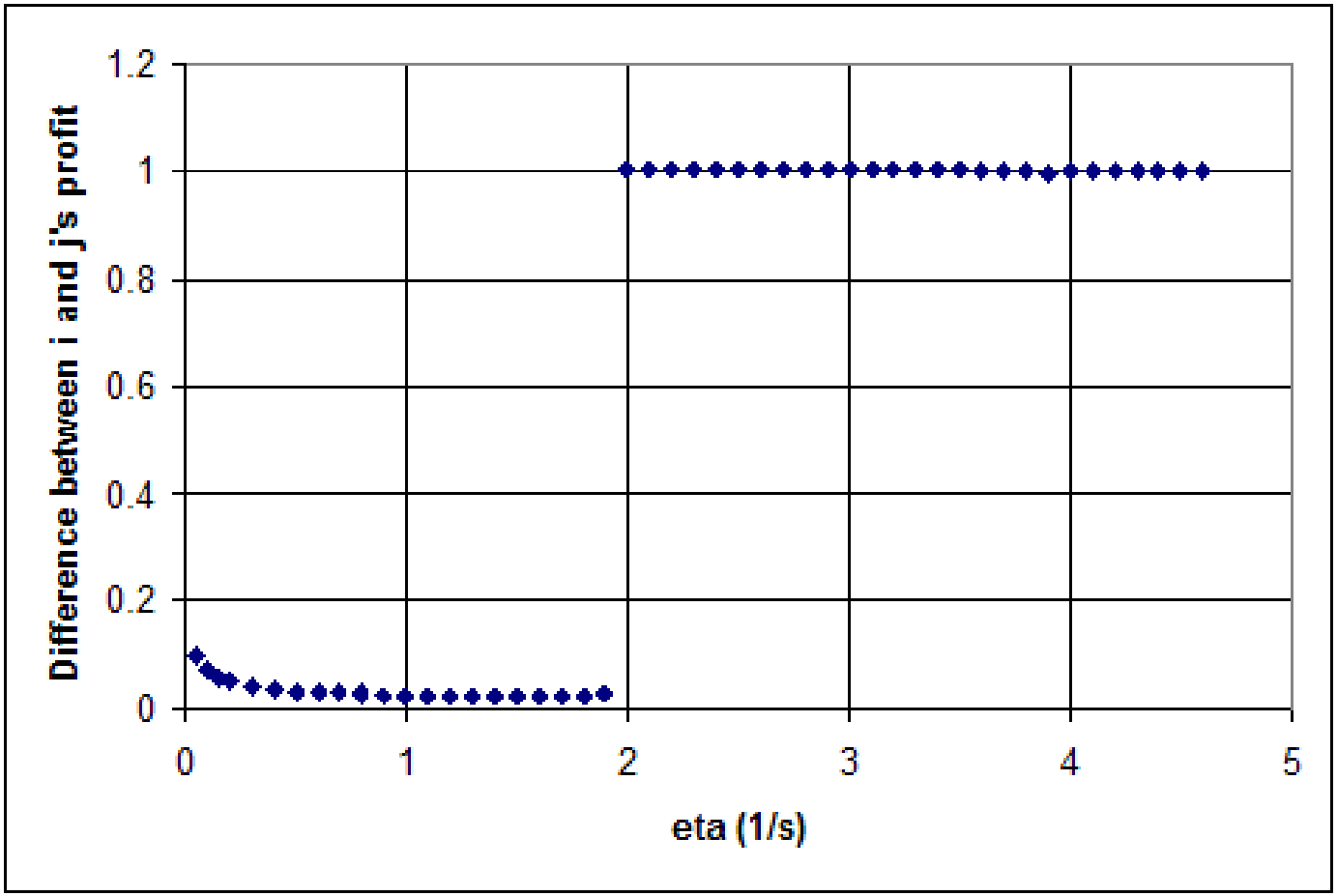

This shows the difference between profits of the bird with the most and the other.
$u_1 = 2, u_2 = 1, c = 0.5$

Resource Allocation - N Birds and N Resources

Bird i will calculate the proportion of time resources are unoccupied, τ_m, by summing the proportion of time the resource is occupied by other birds, τ_m^j.

$$\tau_m = \sum_{j \neq i}^{N} \tau_m^j$$

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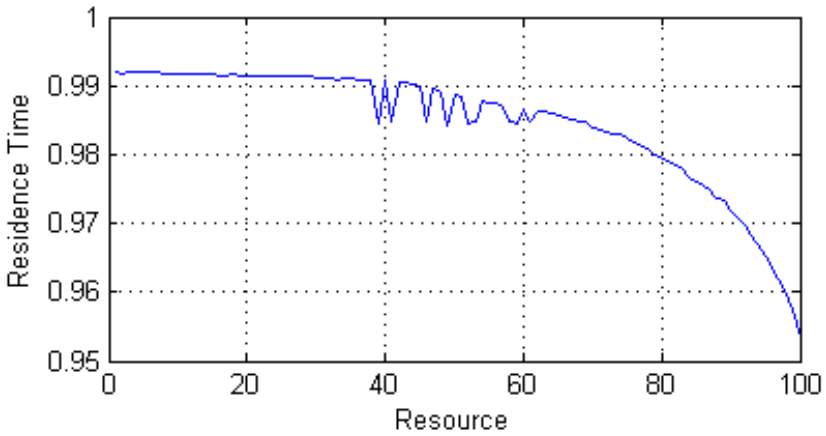
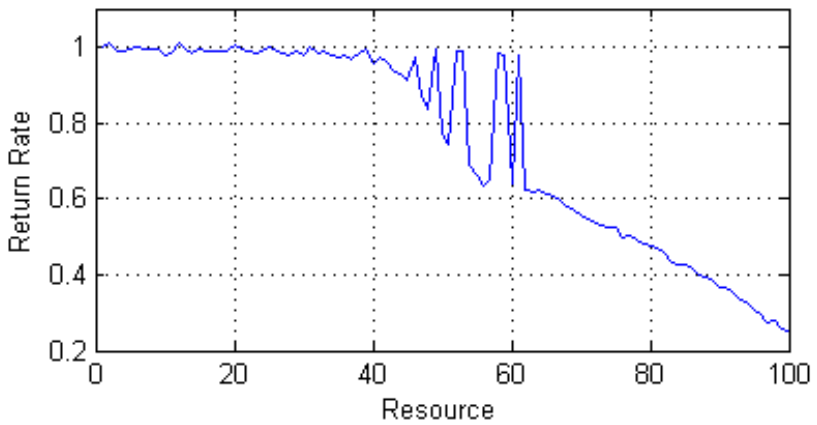
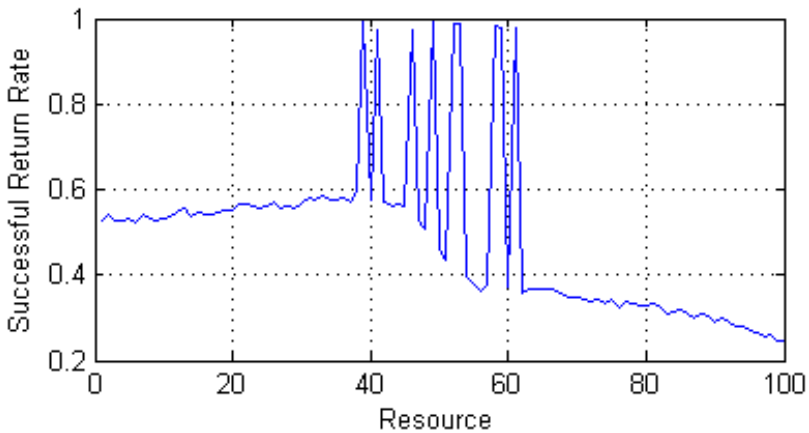
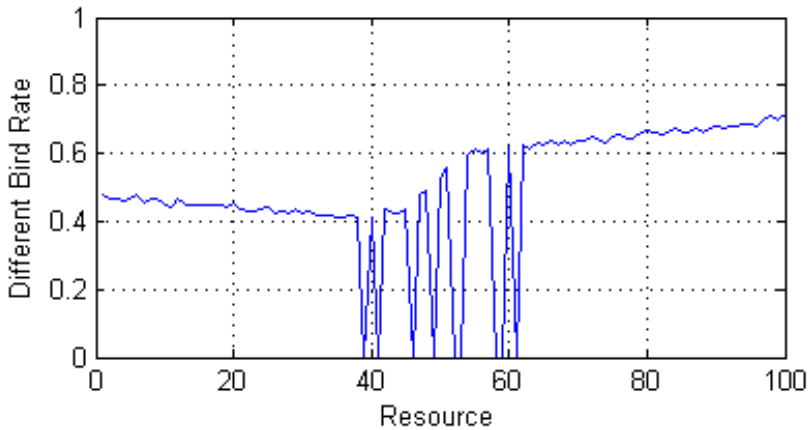
$$u_m - \frac{c}{p(t_m^i, s_m^i, \tau_m)} \geq u_n - \frac{c}{p(t_n^i, s_n^i, \tau_n)}$$

Resource Allocation - N Birds and N Resources









$$N = 100, u_n - u_{n+1} = 1, c = 1, \eta = 64$$

Resource Allocation - N Birds and N Resources

So what's the point?

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- Property rights

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Further Research

- Identify the phase transition

Thank you for your attention