



SAID BUSINESS SCHOOL, University of Oxford

SEMINAR SERIES / HILARY 2011

Convenors: Felix Reed-Tsochas, Institute for Science, Innovation and Society,
Saïd Business School
Eduardo López, Saïd Business School

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Seminar webpage:
www.cabdyn.ox.ac.uk/complexity_seminars.asp

Sandwiches and drinks will be provided

Please note: although the seminar programme detailed was correct at time of printing, seminar arrangements are subject to change - for the latest information, please check the seminar webpage.

Tuesday 22nd February
(12.30 - 2.00pm) James Martin Seminar Room

Dr Eduardo López

Postdoctoral Research Fellow in Complexity Science, Saïd Business School,
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'Percolation induced by disorder'

ABSTRACT

We introduce a model of percolation induced by disorder, in which a network initially homogeneous with all of its links of equal weight is then disordered by the introduction of heterogeneous weights for the links. We consider a pair of nodes i and j to be connected when the ratio α_{ij} of length of the optimal path between them before (ℓ_{ij}) and after (ℓ'_{ij}) the introduction of disorder does not increase beyond a tolerated ratio τ . The quantity α_{ij} , which we call the length factor of the path, emerges as a useful quantity to study the percolation problem in great detail, allowing us to relate our model to previous results in the problem of the weak-strong disorder optimal path problem. By identifying the most probably value of α_{ij} for a system, labelled ac , we are able to find the percolation threshold for our model and relate it to theoretical arguments. Finally, by considering the distribution of sizes of connected components in this disorder induced percolation problem, we present evidence that the transition is of first order, with the size of the discontinuity dependent on the amount of disorder present in the system.

