Description

Author: Jim Duggan.

This new interdisciplinary work presents system dynamics as a powerful approach to enable analysts build simulation models of social systems, with a view toward enhancing decision making. Grounded in the feedback perspective of complex systems, the book provides a practical introduction to system dynamics, and covers key concepts such as stocks, flows, and feedback. Societal challenges such as predicting the impact of an emerging infectious disease, estimating population growth, and assessing the capacity of health services to cope with demographic change can all benefit from the application of computer simulation. This text explains important building blocks of the system dynamics approach, including material delays, stock management heuristics, and how to model effects between different systemic elements. Models from epidemiology, health systems, and economics are presented to illuminate important ideas, and the R programming language is used to provide an open-source and interoperable way to build system dynamics models. System Dynamics Modeling with R also describes hands-on techniques that can enhance client confidence in system dynamic models, including model testing, model analysis, and calibration. Developed from the author’s course in system dynamics, this book is written for undergraduate and postgraduate students of management, operations research, computer science, and applied mathematics. Its focus is on the fundamental building blocks of system dynamics models, and its choice of R as a modeling language make it an ideal reference text for those wishing to integrate system
dynamics modeling with related data analytic methods and techniques.
Lecture Notes in Social Networks. Jim Duggan. System. Dynamics. Modeling with R ...

statistical screening method for system dynamics models (Ford and Flynn 2005) is
implemented, as is a calibration method for data fitting. R also has a differ- ential equation
solver that can be used to implement system dynamics models.

Role model based mechanism for norm emergence in artificial agent societies. Lecture Notes
topology and options on norm emergence. In Proceedings of the 5th international conference
on Coordination, organizations, institutions.

Albert-László Barabási and Duncan J. Watts - 600 pages of classic network analysis articles
(2006). Exponential Random Graph Models for Social Networks, edited by Dean Lusher,
Johan Koskinen and Garry Robins (2013).

Some common network analysis applications include data aggregation and mining, network
propagation modeling, network modeling and sampling, user attribute and behavior analysis,
community-maintained resource support, location-based interaction analysis, social sharing
and filtering, recommender systems.

YAltshuler, Y., Fire, M., Shmueli, E., Elovici, Y., Bruckstein, A., Pentland, A., & Lazer, D.
Social Computing, Behavioral-Cultural Modeling and Prediction Lecture Notes in Computer
Science, 433-440. doi:10.1007/978-3-642-37210-0_47.

The Goldfish package in R allows the study of time-stamped network data using a variety of
models. In particular, it implements different types of Dynamic Network Actor Models
(DyNAMs), a class of models that is tailored to the study of actor-oriented network processess
through time. Goldfish also implements different.

Dynamic optimization of some forward-looking stochastic models. In A. Blaquiere, editor,
Modeling and Control of Systems, volume 121 of Lecture Notes in Control and Information
Design of Communication and Control Strategies.

Model. Original Citation: Giovanni, Zenezini; Maliheh, Ghajargar; Eleonora, Fiore; Alberto, De
Marco (2016). mouth communications, network externalities, and social signals. ... and

2 Feb 2017 . Show description. Read Online or Download System Dynamics Modeling with R
(Lecture Notes in Social Networks) PDF. Similar methodology books. Ethnotheatre: Research
from Page to Stage (Qualitative Inquiry and Social Justice). Ethnotheatre transforms learn approximately human stories right into a.

What's more, there's a mismatch between the logic of participatory media and the still-reigning 20th-century model of management and organizations, with its emphasis on . The dynamics of social media amplify the need for qualities that have long been a staple of effective leadership, such as strategic creativity, authentic.

A (youtube streaming) screencast of my presentation from the Institute for Systems Science and Health 2011 demonstrates how we can leverage such data using 3 systems science modeling techniques: Agent-Based Modeling, classic compartmental System Dynamics modeling, and Social Network Analysis. Presentation.


most stable dynamic network models account for only the addition or removal of a .. F.V-R. gratefully acknowledges financial support from the. Spanish Ministry of Education under . framework that brings us closer to achieving true predictive power of the behavior of techno-social systems. Modern techno-social systems.

pre-processing, data analysis, and data interpretation processes in the course of data analysis. This survey discusses different data mining techniques used in mining diverse aspects of the social network over decades going from the historical techniques to the up-to-date models, including our novel technique named.

Lecture Notes in Social Networks. Jim Duggan. System Dynamics Modeling with R. Lecture Notes in Social Networks Series editors. Reda Alhajj, University of Calgary, Calgary, AB, Canada Uwe Glässer, Simon Fraser University, Burnaby, BC, Canada Advisory Board Charu Aggarwal, IBM T.J. Watson Research Center,.

Vervoort, J. M., D. H. Keuskamp, K. Kok, R. van Lammeren, T. Stolk, T. (A.) Veldkamp, J. Rekveld, R. Schelfhout, B. Teklenburg, A. Cavalheiro Borges, S. Jánůškóva, . The social media storytelling concepts involved less direct interactions with system dynamics but were seen as highly accessible to large scale audiences.

Complex systems; structure and dynamics of social and information networks; agent-based simulations and applications to influencing and social dynamics; . of the ACM; IEEE Communications Letters; Journal of Economic Interaction and Coordination; Journal of Mathematical Biology; Lecture Notes in Physics (Springer)


Read System Dynamics Modeling with R by Jim Duggan with Rakuten Kobo. This new . Lecture Notes in Social Networks . This new interdisciplinary work presents system dynamics as a powerful approach to enable analysts build simulation models of social systems, with a view toward enhancing decision making.


Advances in Artificial Economics, Lecture Notes in Economics and . within a social network, which are well known metrics in social network analysis . Systems. There are different
methodologies and tools for system dynamics modelling. For our work we follow the sensitivity model proposed by Vester (1988, 2007) which.

control model that separates the authorization and access control management responsibilities to provide solutions for distributed and dynamic systems with heterogeneous security requirements. None of these previous work deals with the access control issues related to online social networks. Among the existing works.

Such components include the ecological processes of species interaction, the physical processes of contaminant transport, and the human processes driven by social values, policy and economics. This course presents a system dynamics approach towards understanding and modelling environmental systems.


Most network models focus on either the structural growth of the system — the dynamics of the network — or information diffusion processes — the dynamics on the network. The present work establishes a feedback loop between these two dynamics. Much effort has been devoted to modeling the evolution of social.

22 Mar 2016 . Keywords: System Dynamic · Agent-Based Modelling · Hybrid Models · Complex Dynamic Systems · multi-paradigm approach · Literature Review. 1 Introduction. Modelling and simulation of complex social systems aim at increasing the understanding of the system and testing policies with the objective to.

28 results . Lecture Notes in Social Networks (LNSN) comprises volumes covering the theory, foundations and applications of the new emerging multidisciplinary field . This new interdisciplinary work presents system dynamics as a powerful approach to enable analysts build simulation models of social systems, with a view.


In this paper, we argue that system dynamics (SD) models combined with participatory approaches have . models in the context of urban agriculture and note their potential utility in overlaying quantitative models of urban food .. arise at the community-level social networks at the community level that are just as important.


Network science is a new discipline that investigates the topology and dynamics of such complex networks, aiming to better understand the behavior, function and properties of the underlying systems. The applications of network science cover physical, informational, biological, cognitive, and social systems. In this course.

The three faces of entropy for complex systems – information, thermodynamics and the maxent principle ... Triadic closure dynamics explains scaling-exponents for preferential attachment-, degree- and clustering distributions in social multiplex data ... Lecture Notes in Computer Science 4488, 625-632, (2007) [bib].

This new interdisciplinary work presents system dynamics as a powerful approach to enable analysts build simulation models of social systems, with a view.


radoslaw.michalski@pwr.wroc.pl, piotr.brodka@pwr.wroc.pl, kazienko@pwr.wroc.pl, krzysztof@pwr.wroc.pl. Abstract—The dynamic character of most social networks requires to model evolution of networks in order to enable complex analysis of theirs dynamics. The following paper focuses on the definition of differences.


8 Feb 2017. This course discusses research methods and analysis techniques that allow for the study of human behaviour from a complex systems perspective. Quantification Analysis, Entropy Estimation); Growth Curve models; Potential Theory; and Catastrophe Theory (Cusp model), Complex Network Analysis. This graduate seminar will survey recent work in network science and computational social science from a machine learning and data mining perspective, covering topics such as: properties of real-world networks, graph models, network dynamics, information diffusion, collective classification, and community detection.


20 Aug 2006. static nature of the model can give inaccurate or inexact in- formation . siders networks as complex physical systems and strives to . networks. In Section 3 we present algorithms that use this framework to find some basic properties of dynamic social networks. In particular, we give algorithms for finding the.

8 Aug 2014. Springer, Lecture Notes in. Computer Science, LNCS-6229, pp.1-12, 2010, . Keywords: e-participation, web 2.0, social media, public policy, simulation, system dynamics. 1 Introduction. The design of public policy in most domains is a ‘wicked' problem, since it is characterised by high complexity and many.

Some recent studies used social media crawlers, in particular Twitter data, to understand how communication works during disasters (Houston et al., 2015; Jung et al., .. System dynamics simulation is useful in developing a deeper understanding of the non-linear behavior of complex systems, such as the stress dynamics.
Social systems are in a constant state of flux, with dynamics spanning from minute-by-minute changes to patterns present on the timescale of years. Accurate models of social dynamics are important for understanding the spreading of influence or diseases, formation of friendships, and the productivity of.

More importantly, these platforms generate an enormous amount of time-stamped data, making it possible for the first time to study the fast dynamics associated to different spreading processes at a system-wide scale. These novel and rich data niches allow testing different social dynamics and models that.

However, the effects of endogenous group change on interaction dynamics are a surprisingly understudied area. One way to explore these relationships is through social network models. Network dynamics may be viewed as a process of change in the edge structure of a network, in the vertex set on which edges are.


3 Jan 2012 . Keywords: complex systems, system dynamics, network analysis, agent-based modeling, computer models, simulation. Go to: .. Not only are the behavioral effects of these social systems excluded, but study participants are not allowed to interact with one another as they typically would (132). (In fact, we.

John D. Sterman, Business Dynamics (2000, p. 846). Abstract This chapter provides an overview of model testing in system dynamics, and presents practical methods—using the R framework—that can be used to develop automated model tests. An important challenge in system dynamics is to build client confidence in.

The aim of the introductory course is to give an overview of the different domains of computational social science; (1) big data and society, (2) social networks, (3) social complexity and (4) simulation. After the course one should have an understanding of the different aspects of computational social science, its methods and.

It then considers how the ABC method differs from an earlier generation of modeling approaches, including game theory, equation-based models of computer simulation (such as system dynamics), and multivariate linear models. It also discusses potential weaknesses of ABC modeling and proposes research strategies to.


Figure 1.2: An example of a social network. The nodes correspond to students in a high-school. Two students are linked if they have been.

This graduate-level course will examine modern techniques for analyzing and modeling the structure and dynamics of complex networks. The focus. Applications will be drawn from computational biology and computational social science. Note: An adequate mathematical and programming background is mandatory.


Note: Although networkDynamic shares some of the goals (and authors) of ... This model is very common in the traditional social networks world.

Systems Science is an interdisciplinary field that studies the complexity of systems in nature, social or any other scientific field. Some of the systems science methodologies include systems dynamics modeling, agent-based modeling, microsimulation, and Big Data techniques.

Systems science thinking can help researchers determine which interactions are reinforced, and the social network structure emerges as a consequence of the dynamics of the agents' learning behavior. As the details of the specific game and the reinforcement dynamics vary, we then obtain a class of models. In this paper, we treat some simple reinforcement dynamics.


This course will study social networks with a particular focus on how applying traditional tools, insights, and approaches from theoretical computer science. "Social Structure From Multiple Networks I. Block models of Roles and Positions" American Journal of Sociology.


5 Oct 2010. This six-week seminar will provide graduate students an introduction to social network analysis. Students are expected to come to class prepared for the general discussion as well as present a few articles during the course of the semester. Networks, dynamics, and the small world phenomenon.

these models. This model definition, along with the simulation framework, combines agent-based and system dynamics approaches in a way that retains to supply chain networks, ecosystems, social diffusion and ... Set of tuples of the form (Name, Name, R) specifying rates of flow in the ODE system (either between.


5 Jan 2017. Social Network Analysis Using R teaches analysts how to visualize and analyze data from a social network like Twitter or Facebook with the text-based statistical language, R. If you're involved in analytics in any capacity, this course will be a huge help, teaching you how the R sna and igraph modules.
Science is a complex system. Building on Latour's actor network theory, we model published science as a dynamic hypergraph and explore how this fabric provides a substrate for future scientific discovery. Using millions of abstracts from MEDLINE, we show that the network distance between biomedical things (i.e., people).

We present different types of models as representing different tradeoffs among the four desiderata of generality, realism, fit, and precision. Keywords: agent-based model, childhood obesity, complex systems, computational model, Levins framework, social network analysis, statistical model, system dynamics model.


*Corresponding author, η: tsek@kepe.gr; +30 210 3676371; Postal address: KEPE, 11 Amerikis, 106 72, Athens, Greece. MULTI-EQUILIBRIA REGULATION. AGENT-BASED MODEL OF OPINION. DYNAMICS IN SOCIAL NETWORKS.

My research interests span a number of areas, including: systems science, system dynamics, data science and public health informatics. software designer, consultant and simulation expert, and have an excellent working knowledge of data analytics technologies, including R (deSolve, Caret), Python, and Vensim.

System Dynamics Modeling with R (Lecture Notes in Social Networks) Jim Duggan. This new interdisciplinary work presents system dynamics as a powerful approach to enable analysts build simulation models of social systems, with a view toward enhancing decision making. Grounded in the feedback perspective of.


LANGUAGE LEARNING ASSISTED BY GROUP PROFILING IN SOCIAL NETWORKS . namic model. The algorithm takes as input, to initialize the process, two important students' characteristics – age and knowledge. Our study exploits the fact that ... for language learning in Facebook”, Lecture Notes in Computer.


28 Oct 2015. In this model, we take into account such basic properties of social networks as the dynamics of the intensity of interactions, the influence of public . detect and police deception [15,16], rather than on the mechanisms regulating the appearance of lies and their implications for the structure of social networks.

This site provides a web-enhanced course on computer systems modelling and simulation,
providing modelling tools for simulating complex man-made systems. Topics covered include statistics and probability for simulation, techniques for sensitivity estimation, goal-seeking and optimization techniques by simulation.

Member Jim Duggan, Senior Lecturer at the National University of Ireland Galway, published System Dynamics Modeling with R, which is part of the Springer Lecture Notes on Social Networks. This book provides a practical introduction to System Dynamics, and explains key model structures including material delays, stock.

1 Apr 2013. The study of covert networks is plagued by the fact that individuals conceal their attributes and associations. To address this problem, we develop a technology for eliciting this information from qualitative subject-matter experts to inform statistical social network analysis. We show how the information from.


Networks. Jiuhua Zhao, Qipeng Liu & Xiaofan Wang. Department of Automation, Shanghai Jiao Tong University, and Key Laboratory of System Control and Information Processing, . The most well-known model in social dynamics for the competition of species is the voter model5,6, which has .. Lecture Notes in Business.

We'll start by skimming through the recent book Random Graph Dynamics by Rick Durrett, which has brief chapters on . Old page contains scribe notes and links to preprints, some of which will be copied to this page later. . Lecture based on A Dynamic Model of Social Network Formation (B. Skyrms and R. Pemantle).

individuals (as in sociometry and early small—groups and social-network .. boundaries of the system is, of course, highly consequential. .. Constructing Dynamic Models of Sonic! Systems - 4i partitioned into subsystems of closely connected variables. In models of - single whole societies, it is quite common to partition the.

9 Jun 2011. In the Mentat model, social dynamics, in particular how friendship relationships and couples are formed, has an impact in the evolution of the . Computational models of social systems can improve considerably by integrating fuzzy set theory. . Note that classical sets are particular cases of fuzzy sets.

Effects of the Interaction Between Ideological Affinity and Psychological Reaction of Agents on the Opinion Dynamics in a Relative Agreement Model Norma L. Abrica-Jacinto, ...


Although statistical analysis can of course be applied to longitudinal data, in public health these data are typically discretely longitudinal—snapshots taken at .. Exciting recent developments include the integration of geographic information systems and social network information into agent-based models (10, 37) and the.

We argue that social networking has the potential to change patterns of health inequalities and access to health care, alter the stability of health care provision and lead to a reformulation of the role of health professionals. Further research is needed to understand how network structure combined with its dynamics will affect.


Social networks provide an established tool to implement heterogeneous contact structures in epidemiological models. Dynamic temporal changes in contact structure and ranging behaviour of wildlife may impact disease dynamics. A consensus has yet to emerge, however, concerning the conditions in.

In my lecture notes I try to link the material to relevant topics in social and life sciences and have a more basic introduction to the computer science concepts than in . As such we can develop models for many social phenomena from the herding dynamics on financial markets to the development of friendship networks.


Keywords: Ricci flow; Forman curvature; complex systems; dynamic networks; change detection; . model for structurally different types of interaction networks as occurring in biology or social sciences. However, of the Ricci-flow using a discrete Ricci-curvature on networks introduced by R. Forman [27].

Important note: Other than previously announced, the lectures will start in the first week of the semester (21 April) !!! General Information. Place: Department of Physics, Humboldt University, Berlin-Adlershof. Lectures: weekly, Thursday 13-15 (ct), starting 21 April (Prof. Jürgen Kurths / Dr. Reik Donner / Dr.