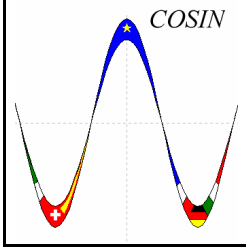

COSIN

IST–2001-33555

Coevolution and Self-Organization in Dynamical Networks

http://www.cosin.org

Organisation of Schools and Conferences

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Project Co-ordinator:	Guido Caldarelli (INFM) *Guido.Caldarelli@roma1.infn.it*
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	CR3 (UB) Universitat de Barcelona *Spain*
	CR5 (ENS) École Normale Supérieure, Paris *France*
	CR7 (UNIKARL) Universität Karlsruhe *Germany*
	CR8 (UPSUD) Université de Paris Sud *France*
	CR9 (EPFL) Ecole Polytechnique Fédérale de Lausanne *Switzerland*

Project funded by the European Community under the "Information Society Technologies" Programme (1998-2002)

Abstract

In this deliverable we present the relevant material that has been produced during the organisation of conferences and schools organised by COSIN. The project also sponsored some other activities, in particular the self-* conference held in Bertinoro and the conference on Complex Systems held in Torino, both in 2004.

SCHOOL AT CISM

A Workshop and a School on "Models and Algorithms for the Web" has been held in Udine (north-eastern part of Italy), in the period June 17 - 22, 2002, under the auspices of the EU projects IST FET ALCOM-FT (Algorithms and Complexity in Future Technologies) and IST FET COSIN (Coevolution and Self-organization in Dynamical Networks) and UNESCO. The aim of the School is to provide researchers (especially young researchers) in computer science, physics, social sciences and related fields with a broad and consistent overview of the most important recent progresses in the area of models and algorithms for the Web. The subsequent Workshop will be the occasion for the presentation of ongoing research work in the area.

The Organising Committee was composed by

- G. Ausiello - University of Rome "La Sapienza"
- G. Caldarelli - INFM and University of Rome "La Sapienza"
- S. Leonardi - University of Rome "La Sapienza"
- A. Marchetti-Spaccamela - University of Rome "La Sapienza"
- P. Serafini - University of Udine & CISM

The list of lecturers was composed by

- Andrei Broder - (Altavista)
- Anna Karlin - (University of Washington)
- Bruce Maggs - (Akamai Technologies and Carnegie Mellon University)
- Christos Papadimitriou - (California University at Berkeley)
- Prabhakar Raghavan - (Verity Inc.)

Programme
Part I - SCHOOL (June 17 - 21, 2002)

During the School, a state-of-the-art presentation of both basic and advanced results will concern the following topics:
- Searching algorithms and data mining on the Web
- Models of the graph structure of the Web and of the Internet
- Game theory and economics of the Internet
- Performance and measurement issues in the Web

Part II - WORKSHOP (June 21-22, 2002)
During the Workshop new results concerning the topics of the School will be presented. Participants of the School are particularly encouraged to present papers in the workshop.
Approximately 15 papers, selected by the organizers, will be presented.
The school had a large number of participants. Further information on this activity together with material and pictures gallery is still available at web site
http://www.dis.uniroma1.it/maw02/

MAW - 2002

Advanced school and Workshop on Models and Algorithms for the World Wide Web

Home |Program |Important Dates |References |Organizing Committee |NEW!: School Material |NEW!: Picture Gallery

A School and a Workshop on "Models and Algorithms for the Web" will be held in Udine (north-eastern part of Italy), in the period June 17 - 22, 2002, under the auspices of the EU projects IST FET ALCOM-FT (Algorithms and Complexity in Future Technologies) and IST FET COSIN (Coevolution and Self-organization in Dynamical Networks) and UNESCO. The aim of the School is to provide researchers (especially young researchers) in computer science, physics, social sciences and related fields with a broad and consistent overview of the most important recent progresses in the area of models and algorithms for the Web. The subsequent Workshop will be the occasion for the presentation of ongoing research work in the area.

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- Searching algorithms and data mining on the Web
- Models of the graph structure of the Web and of the Internet
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- Performance and measurement issues in the Web

LIST OF LECTURERS:

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- Bruce Maggs (Akamai Technologies and Carnegie Mellon University)
- Christos Papadimitriou (California University at Berkeley)
- Prabhakar Raghavan (Verity Inc.)

The lectures will be organized on a basis of 6 hours per day.

Figure The home page of the school and conference.

Midterm MEETING

We organized also a midterm meeting in order to compare the results of the project with the worlkd-wide activity on the field. All the relevant information on this meeting can be found at the project website at the page http://www.cosin.org/midterm.html
It is worth to mention that selected papers from this meeting were published in a special issue of the European Journal of Physics B. We include further information in the documents attached. Here is the content of this special issue.

■ Foreword

141 G. Caldarelli, A. Erzan and A. Vespignani
Preface on "Applications of Networks"

143 Virtual Round Table on ten leading questions for network research

■ General results in complex networks

147 L.A.N. Amaral and J.M. Ottino
Complex networks. Augmenting the framework for the study of complex systems

163 M. Barthélemy
Betweenness centrality in large complex networks

169 A.-L. Barabási, M.A. de Menezes, S. Balensiefer and J. Brockman
Hot spots and universality in network dynamics

177 S.N. Dorogovtsev, A.V. Goltsev and J.F.F. Mendes
Potts model on complex networks

183 G. Caldarelli, R. Pastor-Satorras and A. Vespignani
Structure of cycles and local ordering in complex networks

187 G. Paul, T. Tanizawa, S. Havlin and H.E. Stanley
Optimization of robustness of complex networks

193 C.-M. Ghim, E. Oh, K.-I. Goh, B. Kahng and D. Kim
Packet transport along the shortest pathways in scale-free networks

201 T. Petermann and P. De Los Rios
Exploration of scale-free networks. Do we measure the real exponents?

205 M. Boguñá, R. Pastor-Satorras and A. Vespignani
Cut-offs and finite size effects in scale-free networks

■ Information technology systems

211 F. Menczer
Correlated topologies in citation networks and the Web

223 G. Bianconi
Number of cycles in off-equilibrium scale-free networks and in the Internet at the Autonomous System Level

231 J.I. Alvarez-Hamelin and N. Schabanel
An internet graph model based on trade-off optimization

239 D. Donato, L. Laura, S. Leonardi and S. Millozzi
Large scale properties of the Webgraph

245 S. Valverde and R.V. Solé
Internet's critical path horizon

■ Biological Systems

253 D. Balcan and A. Erzan
Random model for RNA interference yields scale free network

261 V. Vuorinen, M. Peltomäki, M. Rost and M. Alava
Networks in metapopulation dynamics

269 N. Madar, T. Kalisky, R. Cohen, D. ben-Avraham and S. Havlin
Immunization and epidemic dynamics in complex networks

277 D. Garlaschelli
Universality in food webs

287 A.J. McKane
Evolving complex food webs

297 R.J. Williams and N.D. Martinez
Stabilization of chaotic and non-permanent food-web dynamics

■ Interdisciplinary Results

305 D.-H. Kim, B. Kahng and D. Kim
Multi-component static model for social networks

311 C. Castellano, F. Cecconi, V. Loreto, D. Parisi and F. Radicchi
Self-contained algorithms to detect communities in networks

321 M.E.J. Newman
Detecting community structure in networks

331 F. Wu and B.A. Huberman
Finding communities in linear time: a physics approach

339 G. Weisbuch
Bounded confidence and social networks

345 S. Battiston and M. Catanzaro
Statistical properties of corporate board and director networks

353 J.-P. Onnela, K. Kaski and J. Kertész
Clustering and information in correlation based financial networks

363 G. Bonanno, G. Caldarelli, F. Lillo, S. Micciché, N. Vandewalle and R.N. Mantegna
Networks of equities in financial markets

373 A. Arenas, L. Danon, A. Díaz-Guilera, P.M. Gleiser and R. Guimerà
Community analysis in social networks

381 R. Guimerà and L.A.N. Amaral
Modeling the world-wide airport network

387 G. Caldarelli, P. De Los Rios, M. Montuori and V.D.P. Servedio
Statistical features of drainage basins in mars channel networks. Can one guess from the landscape the past presence of water?

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Figure: the content of the special issue of European Physical Journal B

DYRAS 02 S.R.L.

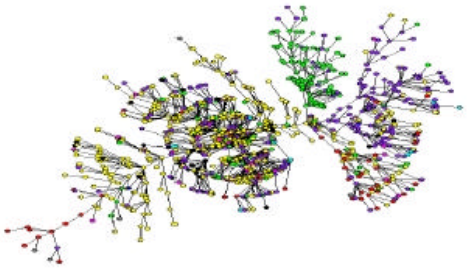
MIDTERM CONFERENCE - COSIN

(FET OPEN PROJECT IST-2001-33555)

CONFERENCE ON GROWING NETWORKS AND GRAPHS IN STATISTICAL PHYSICS, FINANCE, BIOLOGY AND SOCIAL SYSTEMS

ORGANIZING COMMITTEE: *G. CALDARELLI, F. DAVIDE, S. LEONARDI, R. PASTOR-SATORRAS, L. PIETRONERO, A. VESPIGNANI*
LOCAL COMMITTEE: *G. CALDARELLI, M. CASTRI, M. CATANZARO*

SPONSORED BY: *ISTITUTO NAZIONALE PER LA FISICA DELLA MATERIA (INFM), BANCA FINNAT EURAMERICA , TELECOM ITALIA, UNIVERSITÀ "LA SAPIENZA" ,DYRAS02*



ROMA 1-5 SEPTEMBER 2003
AULE S. PIETRO IN VINCOLI, FACOLTÀ DI INGEGNERIA,
UNIVERSITÀ "LA SAPIENZA" V. EUDOSSIANA 18
http://www.cosin.org/midterm.html

INVITED SPEAKERS

L. ADAMIC *(HP PALO ALTO)*	**S. HAVLIN** *(BARILAN UNIV.)*	**L ROSSI** *(ROMA)*
L. AMARAL *(N.WESTERN UNIV.)*	**B. KAHNG** *(SEOUL UNIV.)*	**R. SETOLA** *(CAMPUS BIOMEDICO AND PRES. CONSIGLIO ROMA)*
A. ARENAS *(UNIV. TARRAGONA)*	**P.L. KRAPIVSKY** *(BOSTON UNIV.)*	**R. V. SOLÉ** *(UPF BARCELONA)*
A.-L. BARABÁSI *(NOTRE DAME)*	**J. KERTESZ** *(BUDAPEST U. TECH.)*	**A. M. SPACCAMELA** *(ROMA)*
B. BOLLOBAS *(MEMPHIS)*	**R. MANTEGNA** *(PALERMO)*	**H. E. STANLEY** *(BOSTON UNIV.)*
A. BRODER *(ALTAVISTA)*	**N. MARTINEZ** *(S. FRANCISCO)*	**Z. TOROCZKAI** *(LANL)*
P. DE LOS RIOS *(LAUSANNE)*	**S. MASLOV** *(BROOKHAVEN)*	**D. WAGNER** *(KONSTANZ UNIV.)*
S. DOROGOTSEV *(PORTO)*	**F. MENCZER** *(INDIANA UNIV.)*	**G. WEISBUCH** *(ENS)*
A. ERZAN *(ISTANBUL UNIV.)*	**J. F. F. MENDES** *(AVEIRO)*	
	R. PERCACCI *(INFN TRIESTE)*	

Figure The poster of the conference

MIDTERM CONFERENCE - COSIN TENTATIVE PROGRAMME

	MONDAY 1	TUESDAY 2	WEDNESDAY 3	THURSDAY 4	FRIDAY 5
9.30 – 10.20	**9.30 ONWARD** *REGISTRATION* **10.00** *OPENING*	***R. PASTOR-SATORRAS*** Topology and correlat. in Internet	**9.30** ***R. SETOLA*** **9.50** ***S. BOLOGNA***	***L. N. AMARAL*** Momdel of Signalling Networks	***J. KERTESZ*** Mapping Companies N. from Price Correlation
10.20 - 11.00	***A.-LASZLO BARABASI*** To be announced	***F. MENCZER*** How does the Web really grow ?	**10.20** ***M. TRABATTI*** **10.40** ***M. BOGUNA***	***P. DE LOS RIOS*** To be announced	***R. MANTEGNA*** Minimal Spanning Trees In Stock Markets
11.00 - 11.30			***COFFEE BREAK***		
11.30 - 12.10	***B. BOLLOBAS*** Mathematical models of real world networks	***L. ADAMIC*** Information flow in Social groups	***S. HAVLIN*** To be announced	**11.30** ***V. COLIZZA*** **11.50** ***C. CARETTA***	**11.30** ***M. CATANZARO*** **11.50** ***S. BATTISTON***
12.10 – 12.50	***Z. TOROCZKAI*** Competition in Social Networks	**12.10** ***SHABANEL*** **12.30** ***BARTHELEMY***	***POSTER SESSION***	**12.10** ***K. LEHMANN*** **12.30** ***N. FARID***	***S. LEONARDI*** Large scale properties of WWW
			LUNCH		
14.20 – 15.00	***R. PERCACCI*** To be announced	**14.20** ***M. VILLANI*** **14.40** ***M. ALAVA***	**14.20** ***C. KAMP*** **14.40** ***M. SALES***	***R. SOLÉ*** To be announced	***B. KIANG*** Topology and Univ. In Load Distribution
15.00 – 15.40	***P. DI BATTISTA*** To be announced	***H.E. STANLEY*** Optimal Paths in Dis. Complex Networks	***S. MASLOV*** Large scale Protein Networks	***N. MARTINEZ*** Complex ecological Networks	**15.00** ***R. GUIMERÀ*** **15.20** ***J.-L. GUILLAUME***
15.40 – 16.20	***S. DOROGOTSEV*** Renormalization of Networks	**15.40** ***CONTRARES*** **16.00** ***G. BIANCONI***	***A. ERZAN*** Simple model for gene expression	***D. GARLASCHELLI*** Optimization of Food Webs	***D. WAGNER*** Algorithms for Visualization of N.
16.20 – 16.40	***COFFEE BREAK***			***COFFEE BREAK***	
16.40 – 17.20	***G. WEISBUCH*** Opinion Dynamics	**16.40** ***A. BARRAT*** **17.00** ***C.CASTELLANO***		***L. ROSSI*** Detritus Based Food Webs	***J.F.F. MENDES*** Spectral Analysis of Complex Networks
17.20 - 18.00	**17.20** ***V. SERVEDIO*** **17.40** ***J. A. HOLYST***	***A. ARENAS*** N. in Social Systems		***A. MCKANE*** Model of Food Webs	**17.20** ***J. KIM*** **17.40** ***L. CHEN***
18.00 – 18.20	***B. TADIC***	***M. PATRIGNANI***			

SPECIAL SESSION ON CRITICAL INFRASTRUCTURES

SPECIAL SESSION ON BIO SYSTEMS

SPECIAL SESSION ON FINANCIAL APPLICATIONS

Figure The programme of the midterm meeting

The volume devoted to the midterm meeting

Final MEETING and sponsorships

For the end of the project we also organized another international meeting, also in this case the participants covered most of the state of the art in the field. The information on this conference is available at the web site http://complex.ffn.ub.edu/cosin2005

LIST OF PARTICIPANTS

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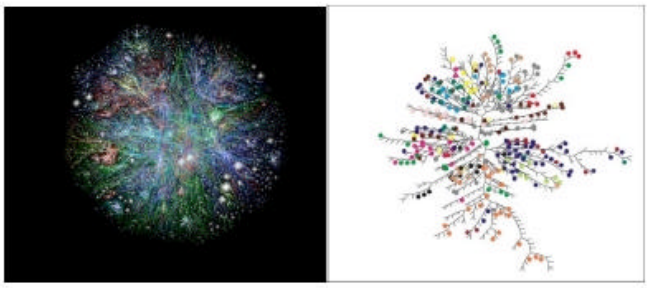
Tomer, K. Bar-Ilan University, Israel
Vespignani, A. Indiana University School of Informatics, USA
Weissbuch, G. ENS, Paris, France
Zhou, C.-S. University of Postdam, Germany

FINAL CONFERENCE - COSIN
(FET OPEN PROJECT IST-2001-33555)

CONFERENCE ON COMPLEX NETWORKS: EVOLUTION AND STATISTICAL PROPERTIES

ORGANIZING COMMITTEE: *A. ARENAS, M. BOGUÑÁ, G. CALDARELLI, A. DÍAZ-GUILERA, R. PASTOR-SATORRAS*

SPONSORED BY: *GENERALITAT DE CATALUNYA, MINISTERIO DE EDUCACIÓN Y CIENCIA, COST P10*



SALOU (TARRAGONA, SPAIN) 14-18 MARCH 2005
AUDITORI MUNICIPAL DE SALOU,
C DE L'ADVOCAT GALLEGO S/N
http://complex.ffn.ub.es/cosin2005

INVITED SPEAKERS

L. AMARAL *(NORTHWESTERN U.)*	**M.E.J. NEWMAN** *(UNIV. MICHIGAN)*
A.-L. BARABÁSI *(NOTRE DAME)*	**Z.N. OLTVAI** *(NORTHWESTERN U.)*
V. BATAGELJ *(LJUBLJANA)*	**S. REDNER** *(BOSTON UNIV.)*
G. CALDARELLI *(ROME)*	**R. V. SOLÉ** *(UPF BARCELONA)*
M. CASTELLS *(UOC - CALIFORNIA)*	**A. VESPIGNANI** *(INDIANA U.)*
P. DE LOS RIOS *(LAUSANNE)*	**D. WAGNER** *(KARLSRUHE U.)*
S. HAVLIN *(BAR ILAN UNIV.)*	**D.J. WATTS** *(COLUMBIA U.)*
S. LEONARDI *(ROME UNIV.)*	**G. WEISBUCH** *(ENS)*

Figure: the poster of the final conference

	Monday	Tuesday	Wednesday	Thursday	Friday
9:00-9:45	REGISTRATION	KAHNG "Communication and transport in complex networks"	LATORA "A topological analysis of the Italian electric power grid"	HAVLIN "Are Complex Networks Self Similar?"	SAN MIGUEL "Voter model and culture dynamics in complex networks"
9:45-10:30	AMARAL "Coordination of distributed agents"	VESPIGNANI	GUIMERÀ "Modules and roles in complex networks: from biochemical networks, to organizations and critical infrastructures"	SOLÉ "Evolved and designed networks: von Neumann revisited"	BATAGELJ "(Nonstatistical) Analysis of Large Networks"
10:30-11:00	COFFEE	COFFEE	COFFEE	COFFEE	COFFEE
11:00-11:45	BERSINI "Is scale-free a realistic topology for growing biological networks?"	DE LOS RIOS "Small world networks: a wiring cost perspective"	HELBING "Network Models of Cascade Failures and Disaster Management"	WEISSBUCH "Dynamics of economic networks"	CABRALES "Building R&D networks: how many conferences should you attend?"
11:45-12:30	KLEMM "Network dynamics with noise resilience: Motifs and attractor scaling"	EGUILUZ "Cooperative hierarchies in dynamic networks"	CALDARELLI "Economical Aspects of Complex Network Vulnerabilities"	HOLYST "Universal scaling of distances in complex networks"	SAMUKHIN "Equilibrium states of random networks"
	BATTISTON "Bankruptcy cascades in production networks"	VRAGOVIC "Excitable homogeneous networks: global versus local properties"			
12:30-1:15	CATANZARO "Correlations in a Static Scale-Free Network model"	GARLASCHELI "Link reciprocity: empirical results and theoretical approaches"	RODGERS "Beyond Topology: Network dynamics to understand the dynamical processes that take place on networks"	BIANCONI "Loops of any size and Hamiltonian cycles in random-scale-free networks"	CAMACHO "Two mechanisms explain food web structure"
	STOUFFER "How are ecosystems constructed: The mechanism for prey selection"	DA FONTOURA "Generalized complex network analysis of neuromorphic models"		SALES-PARDO "Modularity in random graphs"	DONATO "Mining the Inner Structure of the Bowtie"
1:15-3:00	LUNCH TIME				
3:00-3:45	KALISKY "Scale-free networks emerging from weighted random graphs"	KRÖGER "New challenges posed from the interdependent networked systems and human-induced risks"	SPECIAL LUCH	RICOTTILLI "The emergence of Paradigm Setters through Firms' Interaction and Network Formation"	CLOSING SESSION
	ESTRADA "Subgraph centrality, network bipartivity and spectral scaling in complex networks"			TODEVA "Complexity of Business Network Relationships"	
3:45-4:30	GASPARYAN "Network probabilities and statistics: matrix network approach"	SAFFRE "Increasing Survivability of Complex Networks"		PIZARRO "A New Approach to Structural Equivalence: Places and Networks f Places as Tools for Sociological Theory"	COST SESSIONS COLOR
	MEYER-ORTMANNS "Synchronization on Networks with Kuramoto and Roessler Oscillators"			DANON "Community structure and its implications in dynamic processes"	
4:30-5:00	COFFEE	COFFEE	VISIT TO TARRAGONA	COFFEE	
5:00-5:45	JALAN "Behaviour of an isolated node in synchronized clusters on coupled map networks"	DOROGOVTSEV "Critical effects in growing networks"		CHEN "Economic Implications of Network Topologies of Markets"	
	PACHECO "Growth and Preferential attachment provide a robust and unifying framework for the Emergence of Cooperation			POSTER SESSION	
5:45-6:30	LOZANO "Innovators role in diffusion processes	ZHOU "Complex network synchronization: what are the loading parameters?"			
	DUCH "Community detection using extremal optimization"				
7:00	Reception offered by "Ajuntament de Salou"				

Figure: The programme of the final conference

COSIN also sponsored the activity of two other important conferences namely

- Self-* International Workshop, Bertinoro 2004
  http://www.cs.unibo.it/self-star/
- *Sponsor* of European Conference Complex Systems, Turin 2004
  http://www.isi.it/conference.html