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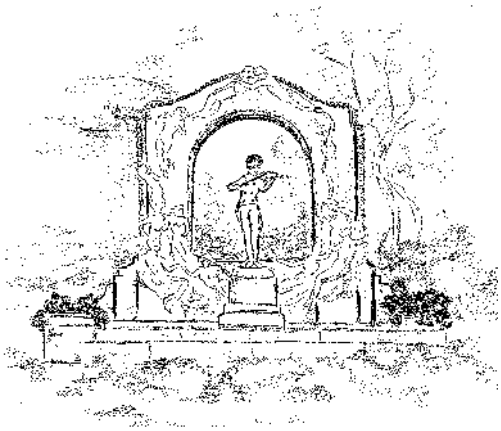
Dear Readers!

Every even year is of special importance for the IFSR. In conjunction with the European Meeting on Cybernetics and Systems Research (EMSCR) we are holding our biannual Board Meeting and (since 1996) also a Strategy Meeting. I therefore hope to welcome many of you in Vienna. The small picture at the right shows the monument of Johann Strauß – king of the waltz – only one of the many sights in Vienna for you to enjoy.
As you can see from the numbering, the Newsletter in its seventeenth year. It is largely thanks to your contributions that the Newsletter is alive. Please continue to supply me with information. You know, I am especially interested in topics for 'New Trends'. Inform us of your ideas, your plans, your research.
In the world of Internet we should also consider sending the Newsletter via e-mail. I hope that at the Board Meeting this matter is discussed. But we need your feedback on whether that is feasible and acceptable. This definitely would be a New Trend.

Yours Gerhard Chroust



Monument of Johann Strauß [I.Wiehart]

DO NOT FORGET!

BOARD MEETING OF THE IFSR

(for representatives of IFSR member societies)
Wednesday, April 15, 1998, 17.30 – 19.30

Wienerwald-SCHOTTENKELLER
Freyung 6, Vienna

A preliminary agenda can be found in the IFSR Newsletter 16/3. All member societies should have received their proper invitation.

STRATEGY MEETING OF THE IFSR

(for representatives of IFSR member societies)
Saturday, April 18, 1998, 9.30-12.30

Wienerwald-SCHOTTENKELLER
Freyung 6, Vienna

EMCSR '98
14TH EUROPEAN MEETING ON CYBERNETICS AND SYSTEMS RESEARCH

April 14-17, 1998, University of Vienna

"AUSTRIANS HATE BEING LUMPED WITH GERMANY"

The people speak German. And they even share a similar respect for traffic signals, orderliness and personal cleanliness. Yet Austria has a distinct culture of its own – and even sit reverence for the traditional Germanic virtues is colored by its people's long-standing reputation of 'schlamperei' (charming sloppiness)…. .

More of these chariming and critical remarks can be found in http://ps.worldview.travelocity.com

IMPRESSUM: Mediuminhaber, Herausgeber, Satz und Layout: Int. Federation for Systems Research. Für den Inhalt verantwortlich: Prof. G. Chroust, Kepler Universität Linz, 4040 Linz, Druck: Druckerei Bad Leonfelden GmbH. & Co. KG, Bad Leonfelden (U)

NEW TRENDS

TESTING WITH PERSONAL PROBABILITIES:

Eleven Year Olds Can Correctly Estimate Their Personal Probabilities .

A. DIRKZWAGER

ARIED@XS4ALL.NL

Testing with personal probabilities is an advantageous alternative to multiple choice testing because guessing is eliminated. A crucial condition is that the subjects should be well calibrated. They are well calibrated when they report their true probabilities of being right. It is shown to be feasible in an ordinary school setting to have even 11 year olds learn to be well calibrated in quite a short time, especially if probability testing is the method they become accustomed to. An interactive computer program to take a test (TESTBET), which was used in the experiment, is described. Its use in regular education is feasible, and the educational advantages are discussed.

If one does not know the right answer guessing is the optimal response strategy with multiple choice tests. Guessing can be expected to reduce the reliability and validity of the test scores). A better method is to have the subjects report their personal probabilities on each of the answer alternatives. Someone who knows need not guess. He or she can assign a probability of one to the right alternative. Someone, who does not know at all, to whom all alternatives are equally likely, need not guess either. He or she may assign equal probabilities to all alternatives.

The majority of examinees, however, will be unsure regarding response alternatives. Some alternatives are more likely to be true than others are. Also in that case, the best one can do is to ask the subject to report the likelihood of each alternative, the personal probability that he or she is right if one picks that alternative in a multiple choice situation.

If the subject is able and motivated to report these probabilities correctly, one has a fine continuous measure of knowledge on that item; namely the probability assigned to the correct answer, or any monotonous function of this probability.

This function is the scoring rule of the test. The simplest scoring rule is the identity function; one takes the probability assigned to the correct alternative for the item score and sums up the item scores to obtain the total test score. With this rule, however, the best test taking strategy is always to assign a probability of one to the most likely alternative, however unlikely it may seem to be true. So again pure guessing is enhanced. A proper scoring rule should be used instead.

A proper scoring rule is a rule such that the subject maximizes the expected score if and only if he or she reports the probabilities truly. Dirkzwager derived such a scoring rule as a linear function of the logarithm of the probability assigned to the correct alternative with constants chosen such that the maximum score per item is 100 points and such that the score is zero if all alternatives are assigned equal probabilities. This score becomes negative for lower probabilities, meaning that in those cases the subject is not only just “uninformed” but even misinformed. In fact he or she may be even holding a serious fallacy. With multiple choice no distinction is possible between these cases.

Two questions arise with regard to this method:

1. Is one not measuring two different factors, (a) knowledge and (b) some personality trait like (self)confidence?

2. Are subjects able to report their probabilities correctly, that is to say, are they well calibrated or at least can they learn to be?

AURA III

AURA AS A WAY TO DEFINE GROUP AWARENESS

Gerald Kotzian

In the IFSR-Newsletters No. 40 (March 1996) and No. 44 (April 1997) two stories appeared about aura: "Aura and the Wasa Story" by Charles Francois and "Aura and the Corpus Juris" by Ernesto Grün. In these articles aura was seen as the something that is left over after a system has disappeared or stopped existing. But aura can also be *the totality of all influences and effects around a person. Occultism and anthroposophy see aura as a radiation phenomenon surrounding the human body* [1]. Similarly to this assumption aura is used in computer supported cooperative work (CSCW), mainly in systems based on a spatial model of

information space, e.g. collaborative virtual environments (CVEs): Aura is the domain of an object or a user. It is the area in which perceptions can be made and actions can be performed.

To understand why this is important, you have to know group awareness. Group awareness is an emerging field in CSCW found important by more and more people working in this area. But what is group awareness?

Psychology defines awareness via a model of memory and recall. It is assumed that there is a memory buffer (the so-called working memory) that deals with all moment-by-moment matters, including both short- and long-term memory information. *Hence awareness is identified with whatever knowledge happens to reside in the working memory at any given time [2].*

Group awareness is synonymous to this psychological definition of awareness: it is everything a user can perceive and use in a collaborative system, without contacting other users or leaving the system. Group Awareness information includes knowledge about other users' locations, states, actions and abilities as well as system-state, orientation aids and information about one's possible actions. Of course it is impossible to supply a user with all that information in a big system with a huge number of users. That is the point where aura becomes an interesting model.

By an increasing number of objects in a system the computational overhead of transmitting all changes of one object to all other objects becomes impossible. *An **aura** is a sub-space around an object which effectively bounds its presence in space and limits this problem [3]*. As objects move across space, they carry their auras with them. Only when auras of two objects collide, the objects establish the chance to interact with each other. For this reason aura provides a very easy and powerful method of information filtering.

To enable auras that are not limited to very small areas, the basic concept has to be extended by two more terms: **focus** and **nimbus**. *The focus is the subspace of aura within which an object is directing its attention [3].* It is a user's "field of vision" and filters the information within the aura. *The more an object is within your focus, the more aware you are of it [3]*. The counterpart of the focus is the nimbus. It is the projection of an object's presence or activity and responsible for the amount of awareness about it.

These three terms exactly determine group awareness between two objects. Focus and nimbus ascertain the degree of group awareness between two objects if the potential for it is established by intersecting auras.

The basic model can be further extended: by adapters, boundaries, etc. or can even be used in sets of objects. The example shows how comprehensive computer science and especially CSCW is. Even terms from occultism like aura are used to define certain contexts.

[1] Bertelsmann Universallexikon, Band 12, Bertelsmann Lexikothek Verlag, Gütersloh 1993

[2] Watts, L.: *Concepts of awareness in human activity,* Position paper for CHI'97 (Mar. 22-27, Atlanta, GA), 1997

[3] Benford, S., Mariani, J.: COMIC Deliverable D4.1 *"Requirements and metaphors of shared interaction",* Lancaster University, 1993

Gerald Kotzian,
Sauerbruchstr. 34, 4600 Wels, Austria

PROJECT REPORTS

EUROBOT
ROBOTICS CONTEST

Eurobot is a French committee which has, every year since 1994, organized a French robotics competition for students from universities and engineering schools.This event is very successful in France; over 180 teams, a TV-show on channel 6 (M6) have attracted more than 3 million viewers.

The robots have to be autonomous and conform to some rules. This year, the robots have to play soccer; the competition proves to be amazing; Now, for the first time, it has been decided to extend the contest throughout Europe.

The rules and the theme will be the same as for the French competition. Documentation of the rules and a video tape (10 minutes) related to the previous French contests are available (free of charge).

Contact: Rachid AIT-MANSOUR, (Manager Eurobot, The European Robotics Contest).
e-mail: ram@anstj.mime-uni-paris8.fr

SEMINAR ON UNEMPLOYMENT

GESI-AATGSC, International Society for the System Sciences, Division Argentina

This Seminar, launched in 1996, started meeting again from March 1997 on.

Twice a month the participants debated in a coordinated way the numerous aspects of the unemployment problem, preparing our annual October meeting. Unemployment is a typically

systemic situation, arising from the coincidence of correlated social and economic processes. The following were taken into account.

- Impact of technological progress through the replacement of human workers by artefacts.
- Time lags in the process of replacement of old obsolete trades by new ones
- Obsolescence of traditional professional knowledge
- Obsolescence of part of our education systems
- Massive appearance of women on the job market
- Revival of the concept of capitalistic efficiency
- Persistent rigidity of employment laws
- Industrialization of new countries
- Globalization

ICSSSE'98

3RD INT. CONFERENCE ON SYSTEMS SCIENCE AND SYSTEMS ENGINEERING

August 25-28, 1998
Beijing China

Topics of this conference are:
Systems theory
Systems Engineering methodology
Applications related to areas:
- Sustainable Development
- Social, Economical and Environmental Systems
- Management
- Industries
- Agriculture
- Military
- Transportation and Communication
- Evaluation

MIS, DSS, GDSS,
Expert System, artificial intelligence
Theories and methods in SE:
- Decision theory
- Optimization
- Soft optimization

System Dynamics
Fuzzy system
Simulation and Forecasting

Preregistration: June 15, 1998

Working language: English.

HCI'98

HUMAN COMPUTER INTERACTION

1-4 September 1998
Sheffield Hallam University
Sheffield S1 1WB, UK

The HCI annual conference is the primary European conference on human-computer interaction. The conference regularly brings together researchers and practitioners concerned with the effective utilisation of computing and communication technology by humans, organizations and society.

15TH INTERNATIONAL CONGRESS ON CYBERNETICS

Namur (Belgium),
August 24-28, 1998

The Congress is organized in symposia, with each having a special subject. The symposia will be organized into 4 main subjects:

- Theories and methods
- Humanities
- Natural Sciences
- Information Technologies and Engineering

The whole of the Congress should have as major topic „Networks". The chairperson of the symposium, proposes the theme, organizes the communications and leads the debate. English and French are the official languages. e-mail address: Cyb@info.fundp.ac.be

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STIQE '98

4th Int. Conference on Linking Systems Thinking, Innovation, Quality, Entrepreneurship and Environment

Maribor, Slovenia,
December 7 - 9, 1998

The **STIQE '98** Conference is the continuation of the discussion launched at three previous STIQE conferences in Maribor, Slovenia. They encouraged an interdisciplinary discussion about **mutual links** of theory and practice of Systems Thinking, Total Quality Management, Innovating, Entrepreneurship and Environmental Care.

The conferences gathered systems) thinkers with diverse professional and intellectual backgrounds. Their fruitful discussions and dialogues (published partly in the renown journal Systems Research) showed that Systems Thinking, Total Quality Management, Innovating, Entrepreneurship and Environmental Care are closely attached and interactive. They have been separated for too

long. In the four decades of the most intensive development of humankind ever, there has also been the most intensive development of the entropy toward its destructive realization. The world is divided, and has perhaps only one characteristic in common all around the Earth: the danger of disappearance. Its cause, in one word, is ONE-SIDEDNESS rather than anything else.
The Program Committee invites you to take part in STIQE '98 and to send us your abstracts/draft papers in the extent of one typed page (maximum).

CASYS 1998

Computing Anticipatory Systems
LIEGE, Belgium, August 10 – 14, 1998
Call for papers

- Anticipatory Systems and Epistemology
- Systems Modelling and Control
- Autonomous Systems and Robotics
- Computational and Dynamical Systems
- Neuronal and Cognitive Systems

Prospective authors are invited to submit a camera ready abstract in English (1-3 pages) before April 1, 1998

e-mail: Daniel.Dubois@ulg.ac.be

NEWS FROM THE BOOK MARKET

INTERNATIONAL ENCYCLOPEDIA OF SYSTEMS AND CYBERNETICS

Charles François (editor)

The International Encyclopedia of Systems and cybernetics presents, for the first time, a complete overview of the field of systems and cybernetics and its development from its beginnings more than forty years ago up to the present. It includes both general and well-known basic concepts and specific and detailed information on the subject. Much of this information was, until now, scattered among hundreds of papers presented in international or national meetings, most of them completely out of reach for the majority of scholars. While redacted in English, it contains also a considerable store of valuable information gathered from sources in various other languages e.g. Dutch, French, German, Italian, Russian, Spanish, etc. The work contains:

- nearly 3,000 entries in alphabetical order
- a considerable quantity of verbatim quotes from hundreds of authors
- more than 1,200 specific references
- general information about Systems and Cybernetic Societies in the world
- principal journals in the field.

The International Encyclopedia of Systems and Cybernetics is an indispensable tool for any scientist, librarian, student or researcher seeking to establish better transdisciplinary communi-cation with specialists in other disciplines. Leaders with economic, political or social responsibilities will want to consult it regularly as will any member of the general public who has questions on this subject. This is a book that should be on the shelf of every university library and in the faculties of philosophy, economy, history, politics, sociology, and communications.
Charles François is a Belgian citizen, born 1922 He retired from the Belgian Foreign Service in 1987. and lives now in Argentina since 1963; He is the author of numerous papers and books on systemic topics.
K.G.Saur München, 1997, 423 pages. hardbound. DM 398.00, ISBN 3-598-11357-9

JOURNALS

CALL FOR PAPERS:

SPECIAL ISSUE ON
META MODELING AND METHODOLOGY ENGINEERING

INFORMATION SYSTEMS :
The International Journal
Spring 1999

Guest Editors:
Kalle Lyytinen, University of Jyvaskyla, Finland
Richard Welke, Georgia State University, USA
Over the years, numerous development and design methods for information systems have been proposed, based on a variety of paradigms, and formal properties, supported. by various tools (e.g. CASE tools).
The Special Issue will focus on the design, construction and evaluation of methods, techniques, processes and support tools for information systems development that are based on concepts of a formal specification of development methods and processes. We solicit innovative and original manuscripts on method and support tool construction, method development, assessment, modelling notations and theories, reference models, meta-modelling frameworks, and method assessment. The special issue seeks to develop an up-to date review of the meta-modelling and methodology engineering and to highlight areas in which more

research is needed.
Topics covered by the special issue include, but are not limited to:

- Method representation formalisms
- Support tools, environments, tool architectures
- Meta-techniques, reference models, ontology

Submissions: Electronic copies of an original, unpublished paper, limited to 6000 words, should be submitted before **1 April 1998** to:
Prof. Kalle Lyytinen, Department of Computer Science and Information Systems University of Jyvdskyld , P.O. Box 35, Fin 40 351 Jyvdskyld Finland, e-mail: kalle@cs.jyu.fi ***or***
Prof. Richard Welke, Department of Computer Information Systems, Georgia State University P.O. Box 4015, , Atlanta, GA 30302-4015, USA e-mail: rwelke@cis.gsu.edu

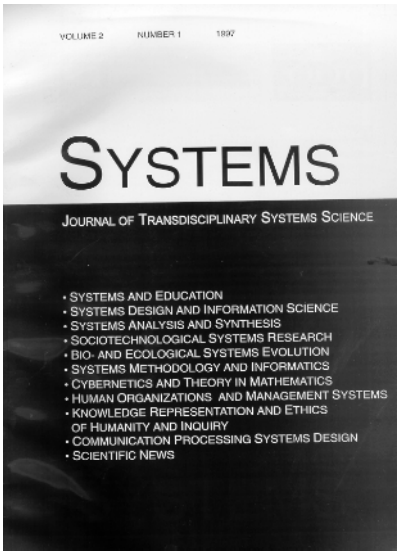
SYSTEMS

Our Polish member organisation publishes a very attractive journal

SYSTEMS – Journal of Transdisciplinary Systems Science

Editorial office: Polish Systems Society

50-370 Worclaw, Wybrzeze Wyspianskiego 27, Poland



News from the IFSR

News from the IFSR

FROM OUR MEMBER SOCIETIES

WELCOME TO THE IFSR!

In its last EC-meeting the IFSR has accepted the membership of the

MANAGEMENT SCIENCE SOCIETY OF IRELAND (MSSI)

It can be reached via its president:
Dr. Cathal Brugha,
MIS Department, University College Dublin
Belfield, Dublin 4, Ireland
tel (353)-1-7068132

We welcome our new member! We will soon report about this society.

CHAOS

In vol. 16, no 2, we welcomed our new member CHAOS (the Centre for Hyperincursion and Anticipation in Ordered Systems. Now we have the pleasure to bring a photo of its president, Dr. Daniel M. Dubois.

ISSS:

ISSS has a new addres:
Int. Society for the Systems Sciences (ISSS)
c/o Dr. G.A. Sanson}
Dept. of Accounting and Business Law
Tennessee Techn. University}
Box 5024}
COOKEVOILLE}
TN 38505, USA}
tel: (1)(931)-372-3883}
fax (1)(931)-372-6249}
email: GASwanson@tntech.edu

IFSR-NEWSLETTERS on FTP!

You can view all past Newsletters since No. 29 (June 1993) on our FTP-Server!
Access *ftp.sea.uni-linz.ac.at* and look into the directory *public/IFSRNL*
Originally Newsletters were numbered consecutively from No. 1 (Autum 1981) to No. 39 (Dec. 1995). Since 1996 they are numbered by volume and number. (vol. 15 no.1 is also 40.
So good luck and enjoy looking into the past.

CALENDAR OF EVENTS

Title	Date and Place	Further Information
Abbreviations: CfP, CfA: Call f.Papers/Abstract, FP: Final Paper due, <No. nn>: more details in issue.nn		
14th European Meeting on Cybernetics and Systems Research <No 16/2>	April 14-17, 1998, Vienna, Austria	Austrian Soc. for Cybernetic Studies, -Schotteng. 3, A-1010 Vienna, Austria, tel: +43-1-53532810, fax +43-1-5320652, email: sec@ai.univie.ac.at http://www.ai.univie.ac.at/emcsr/
First national Conference on systems science <No 16/3>	June 24-26, 1998, Milano, I	Universita' degli Studi Di Milano, Dip. di Scienze della Informazione (AIRS), att. Prof.Mauri, Via Comelico,39,I-20135 Milano, bandini@dsi.unimi.it, fax: +39 (0)2-55006.276 ; tel: +39(0)2- 55006.269
7th Int. Conference in Information Processing and Management of Uncertainty in Knowledge-based Systems (IPMU 98) <Nr. 16/3>	July 6 - 10, 1988 Paris (France)	IPMPU '98, LIP6, UPMC, Case 169, 4 place Jussieu, 75252 PARIS Cedex 05, France, Fax: +33 - 1- 45 75 08 90, e-mail: ipmu laforia.ibp.fr http://www-laforia.ibp.fr/~baslofti/ipmu.html
World multiconference on systemics, cybernetics and informatics: sci'98	July, 12-16, 1998 Orlando, Florida	The International Institute of Informatics and Systemics. Prof.Nagib Callaos, IIIS6220 S. Orange Blossom Trail, Suite 173 Orlando, FL 32809, USA, Fax: +1(407)856-6274, e-mail: SCI98@aol.com, http://www.iiis.org
CASYS'98: 2nd Int. Conf. on Computing Anticipatory Sstems	August 10-14, 1998 Liege, Belgium CfP: April 1, 1998 FP: June 1, 1998	asbl CHAOS, Dr. Ir Daniel M. Dubois, Inst. de Mathematique, Univ. de Liege, Grande Traverse 12, B-4000 LIEGE 1, tel. +32 4 366 94 96, fax: +32 4 355 94 896a, email: Daniel.Dubois@ulg.ac.be, http://www.uulg.ac.be/matgen/CHAOS/CASYS.html
15th Congress International de Cybernetique	August 24-28, 1998 Namur (Belgium),	e-mail address: Cyb@info.fundp.ac.be
ICSSSE'98, The 3rd International Conference on Systems Science and Systems Engineering	August 25-28, 1998 Beijing. PRC	Prof. Jian Chen, School of Economics and Management, Tsinghua University, 100084, Beijing China, Fax: (8610)62785876; Tel: (8610)62785536; (8610)62770331;E-mail: jchen@mail.tsinghua.edu.cn
EUROMICRO'98: Engeinering Systems and Software for the next decade	Aug. 25-27, 1998, Västeras, S	F. Tirado, Dept,. de Informatica y Automatica, Universidad Complutense, 28040 Madrid, Spain Tel.: +34-1-3944378, fax: +34-1-3944687, email: ptirado@dia.ucm.es
IFIP'98: 15th IFIP World Computer Congress: 'The global Information Society' <No. 16/2>	Aug. 31- Sept 4, 1998 Vienna/Budapest	Austrian Computer Society, Wollzeile 1-3, A-1010 Vienna, tel: +43 1 512 02 35-0, fax: -9 email: ifip98@ocg.or.at John v. Neumann Computer Soc., Bahtori u. 16, H-1054 Budapest, tel: +36 1 13 293 49, fax: +36 1 13181 40, ifip98@neumann.hu, http://www.ocg.or.at/ifip98/

HCI'98	1-4 September 1998 Sheffield, UK	Hilary Johnson, Laurence Nigay and Chris Roast HCI'98, School of Computing and Management Sciences, Sheffield Hallam University, Sheffield, S1 1WB,
13th Int. Conference on Systems Science <No. 16/3>	Sept. 15-18, 1998 Wroclaw, PL CfA: Jan. 31, 1998 FP: May 31, 1998:	Prof. Adam Grzech, Wroclaw University of Technology, Institute Of Control And Systems Engineering, Wybrzeze Wyspianskiego 27, 50-370 Wroclaw, Poland, tel: +48-71-320-33-28, fax +48-71-320-3884, email:icss@ists.pwr.sroc.pl, www: http://www.ists.pwr.wroc.pl/13icsss/
2nd Int. Conf. on Evolvable Systems: From Biology to Hardware (ICES 98)	Sept 23-26, 1998 Lausanne, CH CfP: March 1, 1998 FP: June 1, 1998	Perez_Uribe, Swiss Federal Institute of Technology, CH 1015 Lausanne, CH Tel.: +41-21-693-2652, fax : +41-21-6933705, Email: Andres.Peez@di.epfl.ch-
IDIMT'98, 6th Interdisciplinary Information Management Talks	Oct. 21-23, 1998 Zadov, Czech Republic CfP: April 1998 FP: July 1998	Gerhard Chroust, Systemtechnik, Kepler Universität Linz, 4040 Linz, tel: +43-732-2468-866, fax -878 email:Chroust@SEA.uni-linz.ac.at
2nd International Conference on: "Circuits, Systems and Computers " (CSC'98)	Oct. 26-28, 1998 Piraeus, Greece CfP: March 26, 1998	Prof. N.E.Mastorakis, Hellenic Naval Academy, Terma Hatzikyriakou, 18539, Piraeus, GREECE. Email: mastor@softlab.ntua.gr , Fax: (+301) 7775660, http://www.softlab.ece.ntua.gr/~mastor
1998 Frontiers in Education <No. 16/4>	Nov. 4-7, 1998 Tempe, Arizona, USA	(www.eas.asu.edu/~asufc/conference/fiehmpg,htm) or mail to fie98@asu.edu.
Cybernetics and Ecology <No. 16/3>	Nov. 7-10, 1998 Palma de Mallorca, E CfP Jan. 1, 1998	Cybernetics Academy „Stefan Odobleja" - Dragan European Foundation, 153 Calea Rahovei, sector 5, Bucharest, Romania Tel.: (401) 335 37 19, fax: (401(336 07 79 e-mail: ioana hoisescu connex ro
17th Internat. Conf. on Conceptional Modeling (ER'98)	Nov. 16-19, 1998 Singapure CfA: March 27, 1198 FP: July 17, 1998	Tok Wang LING, Dept. of Information Sciences & Computer Sciences, National University of Singapore, Lower Kent Ridge Road, Singapore 119260, email: lingtw@iscsnus.edu.sg, fax: (65) 779-2734
STIQE'98: Linking Systems Thinking, Innovation, Quality, Entrepreneurship and Environment	Maribor, Slovenia, December 7 - 9, 1998	Prof. dr. Miroslav Rebernik or Prof. dr. Matjaž Mulej University of Maribor, School of Economics and Business, P.O.Box 142 (EPF), 2000 MARIBOR, SL Tel.: + 386 62 22 900, Fax: + 386 62 26 681 or + 386 62 22 70 56, E-mail: REBERNIK@UNI-MB.SI or MULEJ@UNI-MB.SI
Synergy Matters: With Systems in the 21st Century: 6th International Conf. of the United Kingdom Systems Society	July 5-9, 1999	Doreen Gibbs, Lincoln School of Management, University of Lincolnshire and Humberside, Lincoln LN6 7Ts, UK Tel. +44 1522 886202, fax +44 1522 886023, Dgibbs@lincoln.ac.uk