

**The International Academy for
Systems and Cybernetic Sciences**

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Emergence, Self-Organization,
Non-Linear Dynamics, Complexity,
Innovation, Complex Engineered Systems,
Complex Societal Systems, Complex Biological and Ecological Systems,
Complex Networks of Networks, Complex Systems Management

**Research, Development and Education in Systems Science and Cybernetics:
paradigms, models and applications**

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64 Academicians (2019/01/22)

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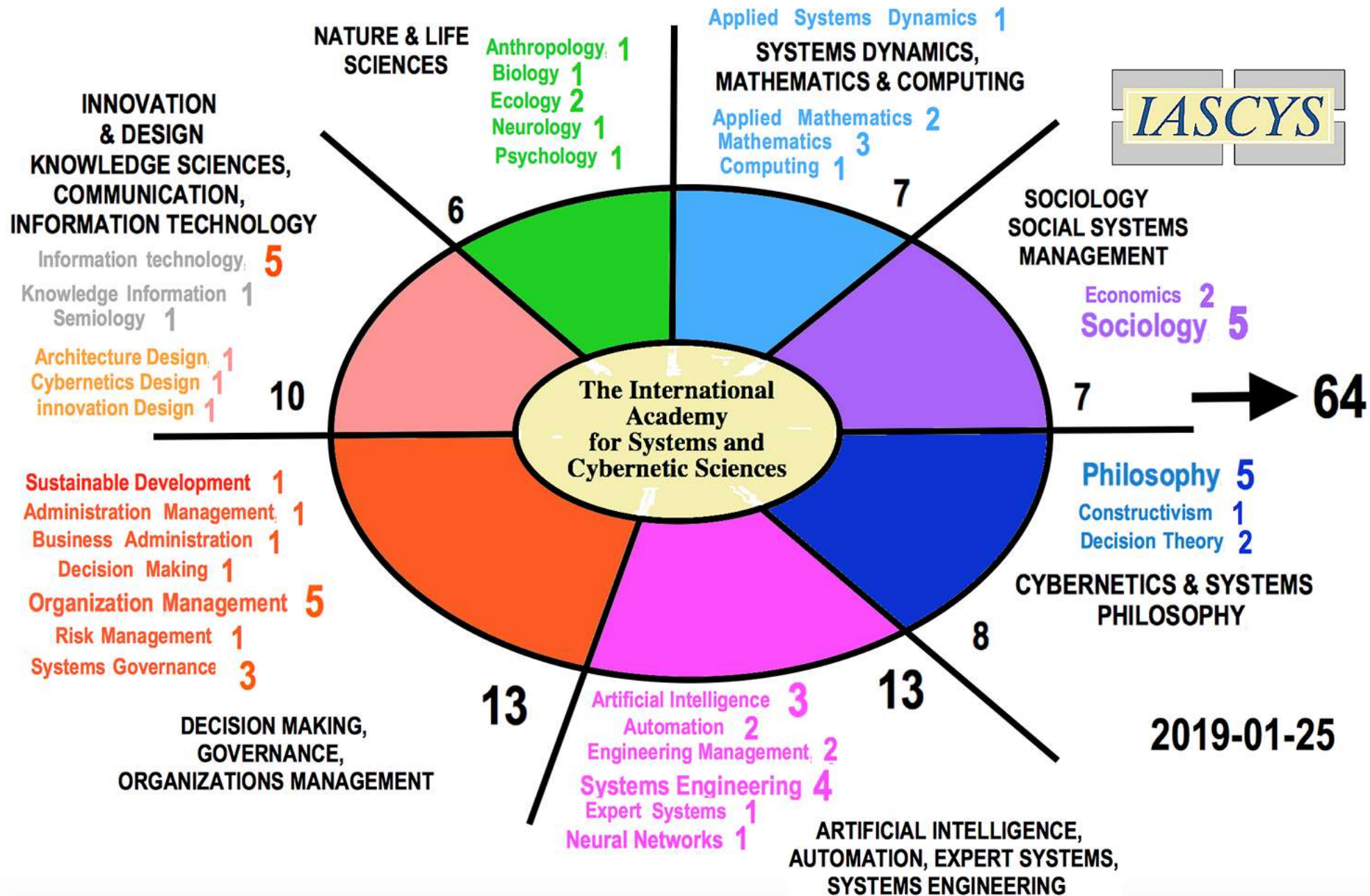
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THE MISSION OF THE INTERNATIONAL ACADEMY FOR SYSTEMS AND CYBERNETIC SCIENCES: SOME RECENT DISCOVERIES

Stuart Umpleby
President of the IASCYS Executive Committee

The International Academy for Systems and Cybernetic Sciences was created as an honor society for people who have made outstanding contributions to the fields of systems science or cybernetics. In addition to choosing people to be academicians, the members of the Academy work to aid the growth and development of these fields. Through conferences and publications we seek to learn what the various societies in the field are doing – what questions they are asking and what themes they are pursuing. We then share our discoveries with colleagues in associations in many countries.

Probably more than scholars in traditional fields, people in systems and cybernetics work on three levels – practice, theory and philosophy. Work at each level is used to test, extend and enrich knowledge on other levels. In our discussions at conferences and through the exchange of papers we have learned that scientists in this field have identified three stages in the development of the field. At the level of observed systems, we work to improve engineered systems, management systems and human communication. At the level of cognition we develop analytic methods and simulation techniques and seek to understand the process of cognition and communication. At the level of social systems we search for reliable knowledge and invent and test institutions and procedures to aid innovation, coordination and consensus-building. However, we have found that these stages are described differently in China, Russia and the US and Europe taken together. So, we are now seeking to learn new theories and methods from each other.

We have found that Americans evaluate theories through their practical utility while Europeans organize knowledge according to the history of philosophy. Combining these two approaches has significant advantages. Americans have tested theories of knowledge through neurophysiological experiments. This work has led to ideas about how to expand the conception of science in accord with basic principles from the philosophy of science. The Chinese have had a strong interest in systems engineering due to the large number of construction projects currently underway in China. They have developed a theory and methods of systems engineering that integrate engineering and management more closely than is done in the US and Europe. Russian scientists have developed a theory of reflexive control and they are increasingly using participatory methods at the community level. There are a variety of views of complexity and reflexivity, and current discussions are comparing the various points of view.

As in the past people working in systems and cybernetics seek to learn from and integrate the knowledge in the traditional disciplines, striving for more general theories and more useful methods.

Stuart A. UMPLEBY https://en.wikipedia.org/wiki/Stuart_Umpleby

Stuart A. Umpleby is professor emeritus in the Department of Management at the George Washington University in Washington, DC. He received degrees in engineering, political science, and communications from the University of Illinois in Urbana-Champaign. Umpleby has published articles in Science, Policy Sciences, Population and Environment, Science Communication, Futures, World Futures, The Journal of Aesthetic Education, Simulation and Games, Business and Society Review, Telecommunications Policy, Journal of the Washington Academy of Sciences, Reflexive Control, Systems Practice, Kybernetes, Cybernetics and Human Knowing, Cybernetics and Systems and several foreign language journals. He is a past president of the American Society for Cybernetics. He is Associate Editor of the journal Cybernetics and Systems. Umpleby has received research grants from the National Science Foundation, the Charles F. Kettering Foundation, the Charles Stewart Mott Foundation, the Nathan Cummings Foundation, the U.S. Department of State's Bureau of Educational and Cultural Affairs and the Central Asia Research Initiative. He has consulted with the World Bank, with government agencies in the U.S. and Canada and with corporations in the U.S., Europe, Japan, and China. He has been a guest scholar at the Wharton School of the University of Pennsylvania, the International Institute for Applied Systems Analysis in Laxenburg, Austria, the University of Vienna, the Institute for Advanced Studies in Vienna and the University of St. Gallen in St. Gallen, Switzerland. In spring 2004 he was a Fulbright Scholar in the School of Economics and Business, University of Sarajevo, Sarajevo, Bosnia-Herzegovina. Between 1981 and 1988 Umpleby was the American coordinator of a series of meetings between American and Russian scientists to discuss the foundations of cybernetics and systems theory. These meetings were supported by the Russian Academy of Sciences and the American Council of Learned Societies. His interest in the transitions in the post-communist countries has resulted in his presenting lectures at various institutes of the Academies of Science of Russia, Ukraine, Poland, Hungary, and Bulgaria. He received the Norbert Wiener Award of the American Society for Cybernetics.

About the IRDO institute for the development of social responsibility (SR) as an informal promotion of systemic behaviour

<http://www.irdo.si>

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Social responsibility provides an informal way of systemic behaviour with its seven principles, **accountability, transparency, ethical behaviour, respect for stakeholders, rule of law, international norms, and human rights**, that support attainment of SR's three basic concepts: responsibility for influences on society, inter-dependence, and holistic approach (ISO 26000). The IRDO institute is a leading Slovenian organisation that contributes to the development of social responsibility in Slovenia and abroad with research, training, consulting, connecting and promotion. It cooperates with domestic and foreign experts, foundations, organisations, governments and companies and helps with the exchange of knowledge and experience regarding social responsibility. By the year 2020, we intend to become an internationally renowned group of experts, scientists and researchers in the field of social responsibility, making an important contribution to the development of SR for companies, organisations, foundations, individuals, governments and to society as a whole. The IRDO -Institute for the Development of Social Responsibility- was founded in 2004 in order to research and accelerate the development of SR in Slovenia and elsewhere. IRDO's main purpose is to promote the networking of key activists concerning SR, whether in government, business, other institutions and organizations, or civil society, and to share common activities and campaigns for raising awareness in society at large about the need and importance of SR. For this purpose:

- we **create and conduct innovative concepts and projects** in the field of social responsibility, including sustainable development,
- we maintain a **platform for the exchange of knowledge and ideas**,
- we **consult and train companies, organisations and foundations** regarding the introduction of SR strategies,
- we **are strengthening a dialogue** with the government, civil society, companies and media for the preparation and realisation of SR strategies, even national ones,
- we **inform the public** about the concept of and various successful projects about SR,
- since 2009 we have been **granting a Slovenian award for social responsibility, Horus**,
- since 2006 we have been **organising an international conference "SR and current challenges,"** of which the 13th is taking place on 27 September 2018,
- we **research** the practice of SR in theory and practice,
- we **publish scientific and technical articles** in Slovenia and elsewhere,
- we **publish books**, manuals, booklets, monthly newsletters and other publications,
- we run **MODEL M** enabling youngsters of 26-30 with B.S. for (self-)employment,
- we work with the government of Slovenia on the **governmental Strategy of promotion of SR in Slovenia**,
- we **work with the 'Sustainable and Socially Responsible University of Maribor'** with its SR-related action program for 2014-2020, etc.

Matjaz MULEJ https://en.wikipedia.org/wiki/Matjaz_Mulej

Matjaz MULEJ, after his Doctorates in Economics/Systems Theory and in Innovation Management, used to work at the University of Maribor, where he still works with doctoral students. He works also in other Slovene higher education institutions. He retired in 2001 as Professor Emeritus of Systems and Innovation Theory. For the recent 10 years he has applied systems theory also to social responsibility as personal and organizational attributes – ethics of responsibility, interdependence and requisite holism. He published more than 1.800 publications in over 40 countries. He was visiting professor at foreign universities for 15 semesters, mostly in US, including Cornell (as Fulbright scholar), also in Austria, China, Germany, Mexico, and gave talks in about 50 further universities around the world. He consulted to organizations in 6 countries about 500 times. He is author of **the Dialectical Systems Theory, Innovative Business Paradigm and Methods for transitional countries and enterprises**; many millions of innovation results value are reported. He is a member of the European Academy of Sciences and Arts, Salzburg (2004), European Academy of Sciences and Humanities, Paris (2004), International Academy for Systems and Cybernetic Sciences, Vienna, now in France (2010; establishing former head, now vice-president). He was president of IFSR, president of the Slovene Systems Research Society (since 1991), head of the research unit of IRDO Institute for Development of Social Responsibility. Under his impact University of Maribor became 'Sustainable and Socially Responsible University of Maribor' with an action program for 2014-2020. He was granted all available official awards for his work on non-technological innovations in Yugoslavia, Slovenia, Maribor and University of Maribor. In 2013-2016 he published and edited 9 books, 3 collections of articles (in Systems Research and Behavioral Science, Cybernetics, Systems Practice and Action Research) with more than 100 authors from 30 countries, and 4 conference proceedings, all about **systemic behavior via social responsibility**. His most recent award is HORUS platina award for 60 years of volunteering as a practice of social responsibility.

Trying to stabilize the population and mean temperature of the World

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Abstract

It is a fact that population and mean temperature of the world grow fast. Literature shows that many studies have been performed about it. Nevertheless, forecasts are not good. Assuming that the key implied factors are the consumption of energy (from the different types of energy sources) and the birth rate, we suggest in this research, as a first step, to state a stochastic demographic model, including the necessary and adequate economic, environmental and well-being variables. This model will be able to optimize, by means of a genetic algorithm, the amount and proportion of the main source types energy consumption as well as the average birth rate in the world, in order to maintain the global present population and mean temperature. The input variables to be optimized (control variables) are the consumptions of: coal, oil, gas, nuclear energy, and renewable energies, as well as, forest area and the birth rate. The scenarios in which to perform the optimization processes (non-controlled variables) are defined by the Human Development Index. The evolution of other variables such as, for instance, unemployment, carbon dioxide production, gross capital formation, water cycle, etc. is obtained as collateral information.

Keywords: global warming; energy consumption types; stochastic demographic model; genetic algorithm; optimization.

Antonio CASELLES

Antonio Caselles has been the Vice President of the "Sociedad Española de Sistemas Generales" (SESGE), the Spanish Society for General Systems, which is a member of the International Federation for Systems Research and the European Union for Systemics. He has also been the Director and Editor of the "Revista Internacional de Sistemas" (International Systems Review), a publication of SESGE. Caselles is interested in the construction of logical-mathematical models which attempt to reproduce the structure and behavior of complex social, biological or ecological systems. These models, as computer programs, allow managers to simulate intervention strategies. He focuses on the automatic programming of computers including search functions that interrelate several variables (*data mining*). Caselles is the author of more than 100 articles published in scientific journals or as book chapters about systems theory and its applications to real-life problems, especially socio-economic, ecological and psychological problems. He has conducted diverse research projects with competitive public financing and has consulted with private companies and government agencies. He is the author of the books: *Control del desempleo por Simulación* and *Modelización y simulación de sistemas complejos*.

Enabling local people and groups to support global organisational development

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31 January 2019

Abstract

The World Organisation of Systems and Cybernetics (WOSC) aims to contribute to the future of humanity. For this purpose, it is currently organising in Moscow, in collaboration with the Russian Academy of Sciences, WOSC 2020, from the 16th to the 18th of September, 2020. Our aim in this Congress is to bring CyberSystemic scientists together with politicians, practitioners and students to debate at all levels, from local communities to global societies, pressing economic, social and ecological problems of humanity. In this contribution I want to advance, in one aspect of the Congress, that of organisational development.

WOSC 2020 will provide space for discussions of philosophical and methodological aspects of systems and cybernetics, highlighting the cybernetics of democracy and governance, the cybernetics of weaving people and technology, and the relevance of transdisciplinary knowledge. It is in this context that I make the following contribution to the IASCYS meeting to be held in Beijing, from the 10th to the 12th of May of this year.

Our organisations emerge from networks of autonomous people engaged in interaction processes ([Espejo & Foss, 2018](#)). People, in collectives, use their skills, resources and capabilities to create and produce whatever outcomes they may wish to achieve. Collaboration in these interactions, to a significant degree, depend on processes of self-organization. In general there is no one with authority to tell all of them what to do and how to interact; they just interact. Often these interaction are inadequate and it is only through learning processes, which depends on cues and signals, that they proceed towards desirable outcomes. To a degree this is the dynamics of organisational development to respond to environmental, social, and economic pressures. Self-organising processes are at the core of their interactions. In today's world technologies, digital and others, are transforming these interaction processes. New forms of communication and relationships are emerging between people and their environments; these are processes towards the constitution of effective organisational systems ([Beer, 1979, 1985](#)), ([Espejo & Reyes, 2011](#)).

However, these systems are more than the outcome of bottom-up self-organisation; they are also, the outcome of guided self-organisation, which, through policies clarify purposes and help to speed up learning processes by enabling relating fragmented resources. Organisational development and problem solving require of both; bottom-up and top-down interactions. The challenge is working out which interaction strategies are necessary to increase response capacity to make sense of an often overwhelmingly complex surrounding. These are aspects related to Ross Ashby's law of requisite variety ([Ashby, 1964](#)). We learn to manage these interactions often at a high cost to people and organisation; hierarchical structures tend to concentrate responses to environmental challenges at the top of the organisation. On the other hand heterarchical organisations try to distribute response capacity and self-organisation throughout the collective, but often their local response capacity is limited by resources. However, current information and communications technologies are increasing the chances of making this distribution effective and the purpose of this contribution is to discuss how to move from top-down structures, which restrict learning at the top, to heterarchical structures which increase learning capabilities throughout the structure.

It is through self-organisation, functional specialisation and coordination, supported by current technologies, that people locally and at all structural levels, learn to correct complexity imbalances among them and between them an environmental agents.

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Research, Development and Education in Systems Science and Cybernetics: paradigms, models and applications.

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Professor **Raul Espejo** is an international expert in organisational cybernetics.

His most recent book “Organizational Systems: Managing Complexity with the Viable System Model” was published by Springer early in 2011 (co-authored with Alfonso Reyes) and is co-author of two other books and co-editor of three. He has published over a 100 articles in journals and books.

In the early 70s, during the Allende’s government in Chile, he was Operational Director of the CYBERSYN project under the scientific direction of Stafford Beer. Since then until 2003, he worked at the Manchester Business School in the UK, the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria and the universities of Aston and Lincoln in the UK. In 1985 he created in the Science Park of Aston University Syncho Ltd, an enterprise in the field of organisational cybernetics. From there he has done research in collaboration with a wide range of institutions worldwide, mainly in organisational diagnosis and design, with a focus on social transformation, organisational learning and democratic processes.

Currently he is President of the World Organization of Systems and Cybernetics <http://wosc.co> and Director of Syncho Ltd in the UK.

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<http://www.armsada.eu/pb/resplASCYSpageEN.pdf>

Better Individual Healthcare and Welfare with Foot Reflexotherapy and Energetic Chronotherapy

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Abstract

The core of the Taoism philosophy of the optimal *balance between Yin-Yang* is the same as the *meden agan* Antique Greek philosophy [3]. Both agreed that *sustainability* is obtained neither through a greater *efficiency* (yang excess) nor through a greater *resilience* (yin excess) but with an in-between optimal balance, a *window of viability*. From their experience of interactions between Man and Nature, particularly in agriculture and health, the Chinese ancestors pointed to the ethics of *the harmony and the order*. Confucius said: "*harmony is over all*". To maintain the harmony between Man and Nature is the systemic way for sustainability and Societies have to respect the laws of Nature [6]. Taoism principles made their proofs in *ecology* [7], which is the economy of Nature: too little diversity (yang excess) leads towards breakage, too much (yin excess) leads to stagnation, and in *economy*: complementary currencies of diverse types enable economy to flow back towards greater sustainability [12]. Unless proved otherwise, every living system is rhythmic. Biological rhythms are essential components of *homeostasis*, and *periodicity* is inherited. Major pathologies result from *rhythm disruption*. Drugs show rhythmic variations in pharmacokinetics and pharmacodynamics [1]. Drugs abuse makes money but has triggered antibiotic resistances and environmental pollution [4]. Other ways for *quality-of-life restoration* are needed [10]. Since 5000 years, with antique *Egyptian medicine and traditional Chinese medicine*, foot reflexotherapy was experimented and taught, with success. With time the energetic principles were forgotten and it was misapplied and rejected by modern occidental chemical medicine. But with the failure of more and more aggressive treatments it was re-discovered. Foot reflexotherapy can be used for *diagnosis* and as a tool [8] for chronic pain, vascular flow and lung or breast cancer treatments [13]. In a study, with a significant number of patients, 100% improvement was found [11]. **How to summarize what the research knows? How to use reflexotherapy tools? How to prove their efficiency?**

Energetic reflexotherapy results of 12 years of monitoring, with 8 to 85 years old men and women, taking drugs or not, were randomized against foot massage or non-energetic reflexology results [9], as '*placebos*', and general practitioner, acupuncturist, physiotherapist, rheumatologist, endocrinologist, neurologist or osteopath, results, as '*controls*'. Improvements were *significant* for: -exhaustion, insomnia, night awakenings, anxiety, hypersensitivity, depression, stress, agitation, confusion, dizziness, ictus, memory loss, headaches, migraine, -cognitive or motor dysfunction, traumas; -anorexia, loss of appetite, excess weight, obesity, -sugar or tobacco addiction, perverted taste sensation; -diarrhea, constipation, intestinal obstruction, abdominal discomfort, flatulence, colitis, -stomach discomfort, irritation, ebb or ulcer, dysphagia or dyspepsia, nausea, vomiting; -too low or too high blood pressure, palpitation, -low blood flow, venous or lymphatic drain disorders, edemas, haemorrhoids, veins varicose, syndrome of Raynaud; -hormonal disorder, pineal, pituitary or hypothalamus disorders, libido disorders; -bone, muscle, nerve or vessel pains, cramps, sciatic pain, facial neuralgia; -allergy, inflammation, skin disorders, eczema, acne, lupus; -osteoporosis, osteoarthritis, rheumatism, fibromyalgia, hernia; -rhinitis, bronchitis, emphysema, asthma, -apnea, mucositis; -nephritis, cystitis, incontinence, -pancreatitis, diabetes; -kidney cysts, thyroid nodules.

Taking into account *chronobiology* [2], *reflexotherapy* not only get success in diagnosis and treatments but also can be used to evaluate the efficiency of other therapies like *lithotherapy* [5]. Periodicity is a key component of therapy evolution and evaluation. Harmony preservation is governed by means of *the law and the order*. Our body is a living system of systems [3], a society of cell actors, that must be governed by the order, what allows to establish a hierarchy, a system of *energetic controls*, laws that govern physiological relations and survival rules [6]. Every parts of our body are interacting together, for the best and for the worst. Only treating the right part, but *in the right way and at the right time* means to treat the whole body [5]: *'interaction is construction, construction is interaction'* [10, 3].

keywords: agoantagonism, energetics, ethics, harmony, health, homeostasis, interaction, longitudinal chronobiology, lithotherapy, reflexology, randomized controlled trials, rhythms, sustainability, systems science, wu-li shi-li ren-li, yin-yang

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Second order systems: cybernetic foundations for the social sciences.

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Abstract

This paper presents a theory of second order systems with a view to showing how it may serve as foundations for the social sciences. Currently, with rare exceptions, penetrations of cybernetic and systems theoretic concepts into the social sciences have been sporadic and, arguably, conceptually confused. The aim of the theory is to mitigate this lack and these confusions by providing a coherent conceptual framework that can bring order and transdisciplinary unity. I provide examples of the theory's relevance for key topics in the disciplines of psychology, sociology and cultural anthropology (consciousness, communication, observation and reflexivity). I also review some examples of existing applications of cybernetics and systems theory in the social sciences and indicate their shortcomings. I show how the conceptual framework can ameliorate them. My critiques and proposals are intended to serve the transdisciplinary and metadisciplinary aims of cybernetics and the systems sciences of bringing order and unity to other disciplines. I believe my proposals are helpful also in understanding the relations between theories and concepts in cybernetics and the systems sciences. I briefly provide some justifications for this view. Topics covered include: the emergence and ontogeny of second order systems, the dynamics of second order systems, the interaction of second order systems and second order systems theory applied recursively to individual social actors, families, organisations, cultures and social systems.

Key words systems sciences, social sciences, second order cybernetics, second order systems

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