ECOMOD

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About ISEM

The International Society for Ecological Modelling (ISEM) promotes the international exchange of ideas, scientific results, and general knowledge in the area of the application of systems analysis and simulation in ecology and natural resource management. The Society was formed in Denmark in 1975, and today has chapters in Europe, Asia, and North- and South-America. ISEM sponsors conferences, symposia, and workshops that promote the systems philosophy in ecological research and teaching, and in the management of natural resources. The Society publishes the newsletter ECOMOD, and its members frequently contribute articles to the official scientific journal of the Society, *Ecological Modelling*.

Perspectives

Howard T. Odum

Environmental Engineering Sciences

University of Florida, Gainesville, Florida, USA

Suggestion for a Project for The International Society of Ecological Modelling:

Representing Simulation Models With Energy Systems

Abstract: This is a proposal for an ISEM project to represent the full detail of published simulation models in a form readily understood from inspection of network diagrams on paper. In a project supervised by committee and with the participation and approval of the authors of each model, an atlas of diagrams of simulation models can be prepared. Each diagram should be accompanied by the difference and logic equations extracted from the computer codes and also represented by the symbol network. Making models visible and more easily understood will encourage use by more people, more discussion of the structure and functions in previous models, and more building of one effort on another. People can trust a model better if they understand what is in it. Then they can suggest the changes they require for additional used in other situations.

Energy Systems Language

In wide usage since 1966, the symbols and diagramming rules of the energy systems language are used to represent a model in Figure 1. The language contains mathematical equivalents, energy constraints, and means of representing information as summarized in the Appendix from a recent book [1]. When symbols are placed on the page from left to right in order of their energy transformity, a model drawn by one person is congruent with those of another. Whereas the language is also used qualitatively in a soft way as a first step in converting verbal, mental models to network form, this project might rigorously represent already published, simulated models. Detailed explanations of the language's use and mathematical definitions are already available in many books and papers [2], but a committee of the society could choose to modify or elaborate symbols and rules for these purposes.

Example

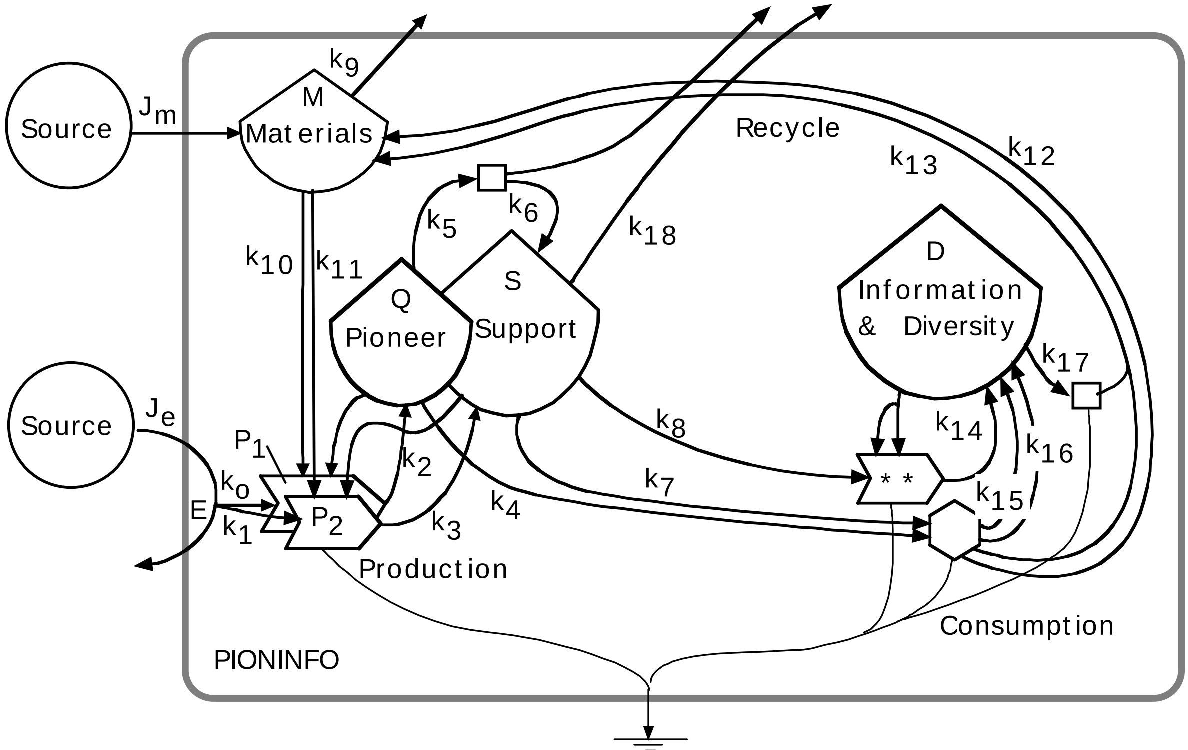
The simulation model diagrammed with energy systems symbols in Figure 1 has the equations that are implied [3]. More complex models require several pages. It may be desirable to include at least one simulation run (example: Figure 2) so that readers can better understand what is involved. Authors, graduate students, or secretaries can generate figures from pencil drawings with little training. With the symbols in memory as "macros", Figure 1 was drawn with CANVAS in 1-2 hours. After being checked by authors, figures are easily edited and printed out.

Participation of Authors

Whereas the translation of an energy systems diagram to equations is rigorous and unambiguous, the reverse translation of equations to systems diagrams has more than one solution. For example, a systems design on paper that translates to logistic differential equation is clear, but for mathematical equations that reduce to the logistic, we know of 18 different network designs, each with different mechanistic rationale. Thus, the participation of the authors of a model is needed to make sure that the network mechanisms are the ones originally intended. Also, the diagramming requires the energy processing to be shown, another aspect that may require the author to indicate what was in mind. For example, an algorithm used by Richard Wiegert to model consumer animal populations, when diagrammed with aid of one of his former students, was different and clearer than one done without participation of the modeller (although both were mathematically correct).

An Aid to Comparative Ecology

So called "canned" models developed for one area are being systematically applied in other areas and ecosystems by integrative organizations such as the network of Long Term Ecological Research sites (LTER'S) of the National Science Foundation. The participants in these group projects have no easy way to know the details of the models. Even the authors of models using them later do not remember all the details. Even when code print-outs are available, it is not easy to see what is being represented, what should be



$E = J_e - k_o*E*M*Q - k_1*E*M*S$ Therefore $E = J_e / (1 + k_o*M*Q + k_1*M*S)$

$P = P_1 + P_2$ where $P_1 = k_2* E*M*Q$ and $P_2 = k_3*E*M*S$

$C = k_4*Q + k_7*S + k_8*S*D*D$ $P_{net} = P - C$

$dQ = P_1 - k_4*Q - k_5*Q$

$dS = P_2 + k_6*Q - k_7*S - k_8*S*D*D - k_{18}*S$

$dM = J_m + k_{12} *Q + k_{13}*S - k_9*M - k_{10}*E*M*Q - k_{11}*E*M*S$

$dD = k_{14}*S*D*D + k_{15}*S + k_{16}*Q - k_{17}*D$

Figure 1. A simulation model relating productivity, competitive dominance of successional weeds and diversity [2].

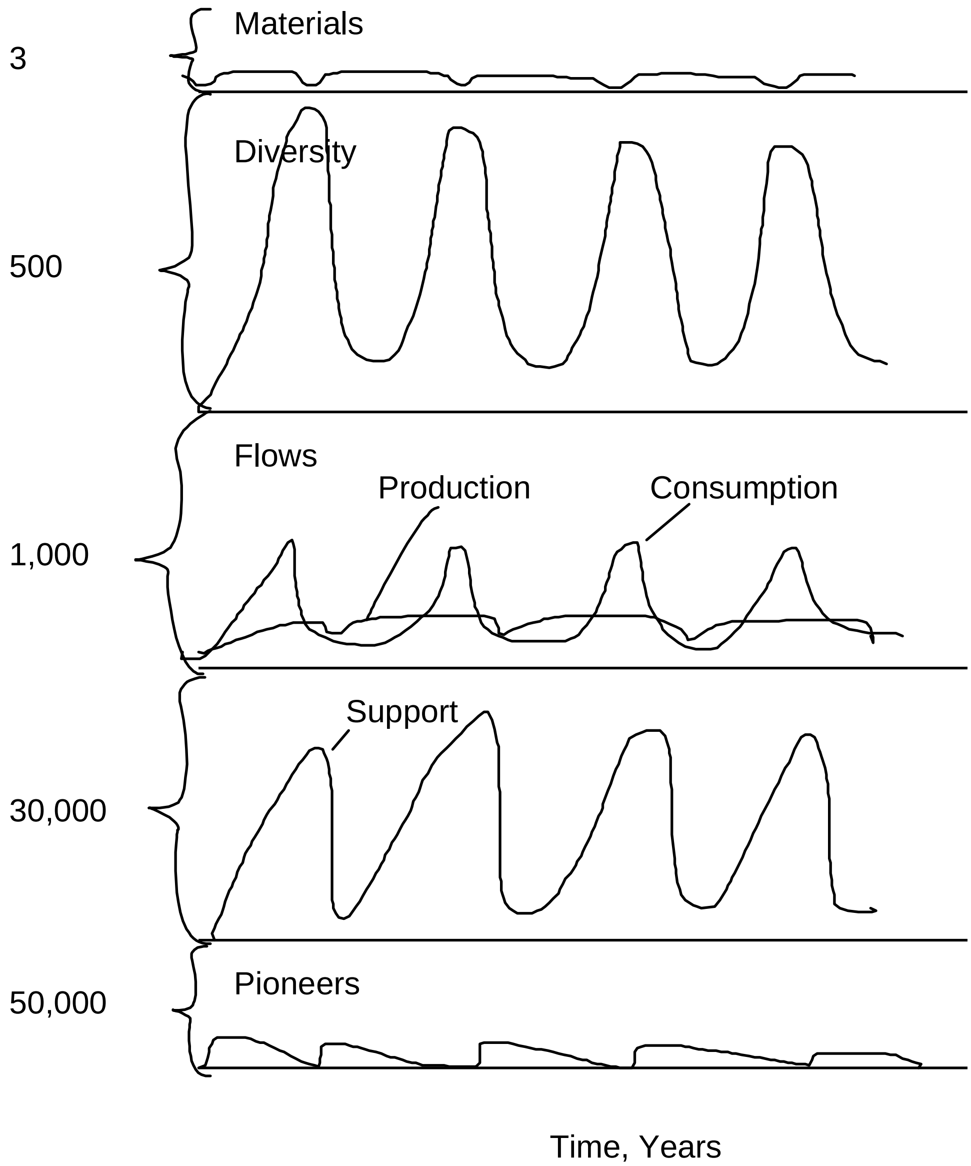


Figure 2. A simulation of the productivity-diversity model in Figure 1 showing initial low diversity of pioneers using excess resources (materials and energy) being replaced by high diversity and recycle processes [2].

[Editor's note: Due to a software incompatibility, Figure 2 is not an exact reproduction of the material submitted by Dr. H. T. Odum]

modified, or how an investigator dealing with a particular part can relate.

For example, the Century model is being used in a general way in more than one biome of the NSF Long Term Ecological Research groups. A first draft of a diagram of that model showed it to be a soil organic matter

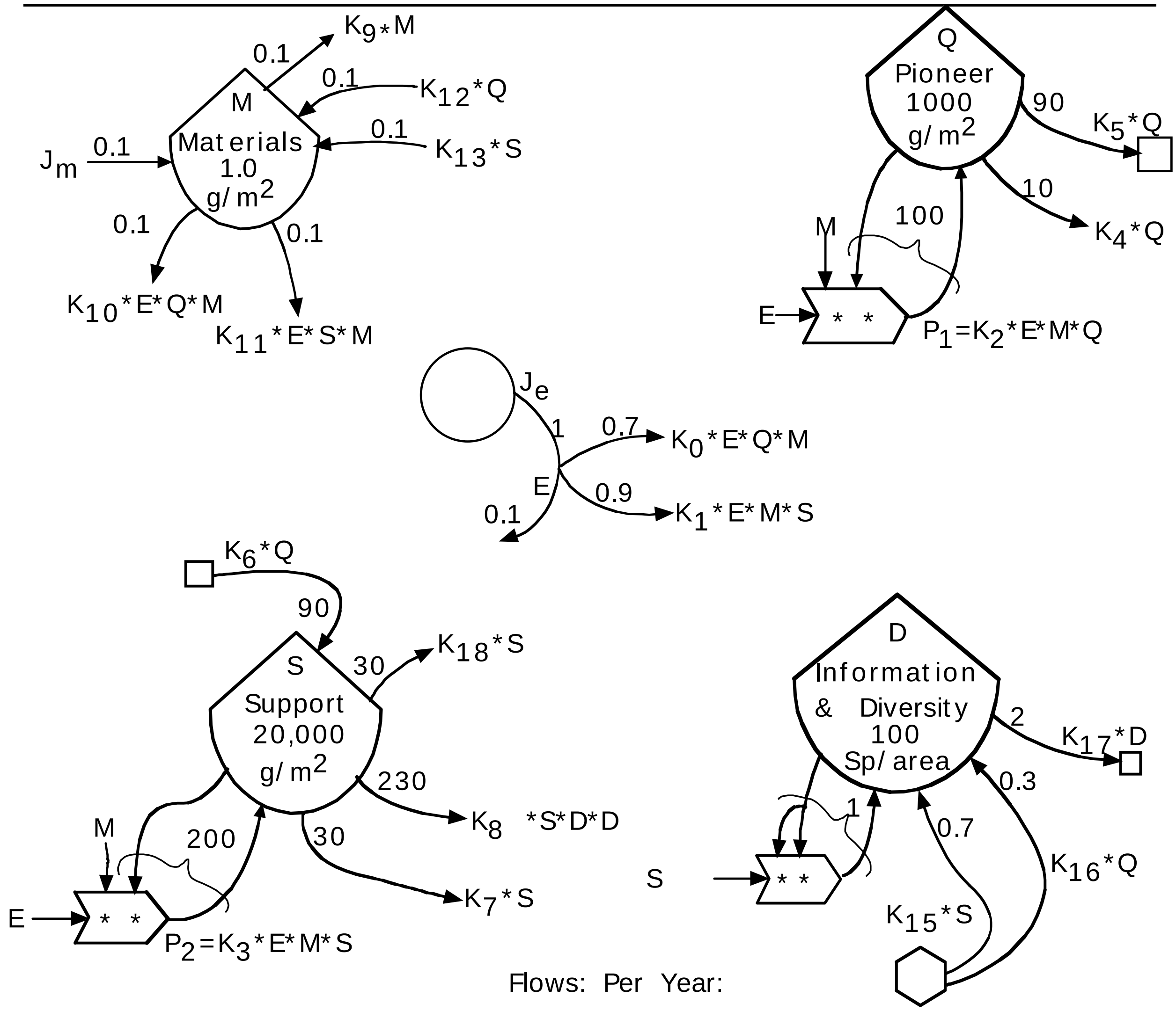


Figure 3. Symbols of the model PIONINFO in Figure 1 isolated to document calibration.

model with storages and pathways of organic matter on several scales with other aspects of ecosystems de-emphasized. Robert Waide, coordinating exchange between LTER programs, recently endorsed the intent of this proposal.

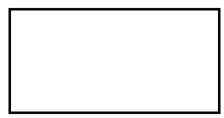
References

[1] Odum, H.T. 1996. Environmental Accounting, Emergy and Decision Making. J. Wiley, NY, 370 pp.

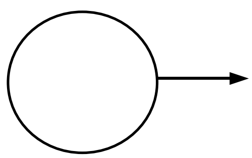
[2] Odum, H.T. 1983, 1993. Systems Ecology (reprinted as Ecological and General Systems). Univ. Press of Colorado, Niwot, CO, 644 pp.

Appendix
Use of Energy Systems Symbols

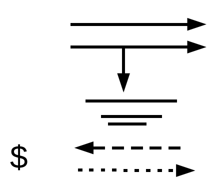
SYSTEM FRAME-- A rectangular box is drawn to represent the boundaries that are selected. Boundaries selected must include three dimensions. For example, the analysis of a city would probably
include its political boundaries, a plane below the ground surface (example, 10 m), and a plane above the city (example, 100 m).



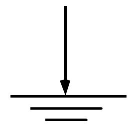
SOURCE-- Any input that crosses the boundary is a source, including pure energy flows, materials, information, genes, services, and inputs that are destructive. All of these inputs are given a circular symbol. Sources are arranged around the outside border from left to right in order of their solar transformity starting with sunlight on the left and information and human services on the right. No source inflows are drawn in to the bottom.



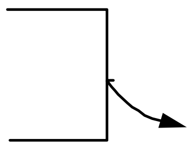
PATHWAY LINES-- Any flow is represented by a line, including pure energy, materials, and information. Money is shown with dashed lines. Where material flows of one kind are to be emphasized, dotted lines are suggested (or color). Barbs (arrowheads) on the pathways mean that the flow is driven from behind the flow (donor driven) without appreciable backforce from the next entity. Lines without barbs flow in proportion to the difference between two forces; they may flow in either direction.



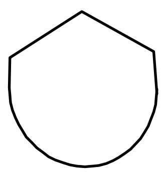
HEAT SINK-- The heat sink symbol represents the dispersal of available energy (potential energy) into a degraded, used state, not capable of further work. Representing the second energy law, heat sink pathways are required from every transformation symbol and every tank. At the start, one heat sink may be placed at the center bottom of the system frame. Then two lines at about 45 degrees to the bottom frame border are drawn to collect heat sink pathways. Using finer lines or yellow lines for heat sinks, keeps these from dominating the diagram. No material, available energy, or usable information ever goes through heat sinks, only degraded energy.



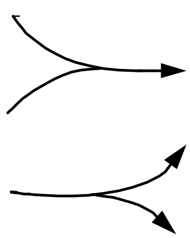
OUTFLOWS-- Any outflow which still has available potential, materials more concentrated than the environment, or usable information, is shown as a pathway from either of the three upper system borders, but not out the bottom.



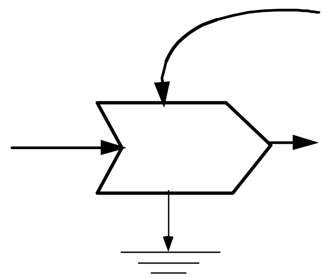
STORAGE TANK-- Any quantity stored within the system is given a tank symbol, including materials, pure energy (energy without accompanying material), money, assets, information, image, and quantities that are harmful to others. Every flow in or out of a tank must be the same type of flow and measured in the same units. Sometimes a tank is shown overlapped by a symbol of which it is part. For example: wood storage, a part of Radiata Pine population in Figure 13.1a.



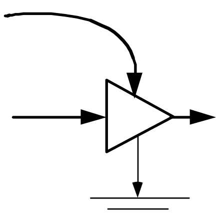
ADDING PATHWAYS-- Pathways add their flows when they join or when they go into the same tank. No pathways should join or enter a common tank if they are of different type, transformity or measured in different units. A pathway that branches represents a split of flow into two of the same type (Figure 2.6).



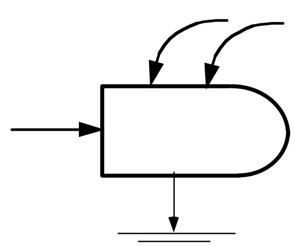
INTERACTION-- Two or more flows that are different and both required for a process are connected to an interaction symbol. The flows to an interaction are drawn to the symbol from left to right in order of their transformity, the lowest quality one connecting to the notched left margin. The output of an interaction is an output of a production process, a flow of product. These should usually go to the right, since production is a quality-increasing transformation.



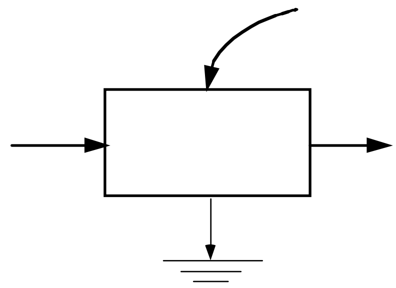
CONSTANT GAIN AMPLIFIER-- A special interaction symbol is used if the output is controlled by one input (entering symbol from left), but most of the energy is drawn from the other (entering from the top).



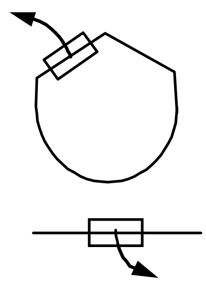
PRODUCERS-- Producer symbols are used for units on the left side of the systems diagram that receive commodities and other inputs of different types interacting to generate products. The producer symbol implies that there are intersections and storages within. Sometimes it may be desirable to diagram the details of interactions and processes inside. Producers include biological producers such as plants and industrial production.



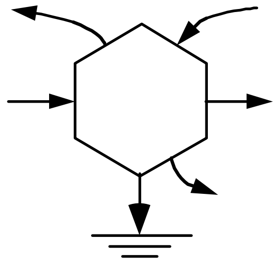
MISCELLANEOUS BOX-- The rectangular box is used for any subsystem structure and/or function. Often these are appropriate for representing economic sectors such as mining, power plants, commerce, etc. The box can include interactions and storages with products emerging to the right. Details of what goes on in within the consumer is not specified unless more details are described or diagrammed inside.



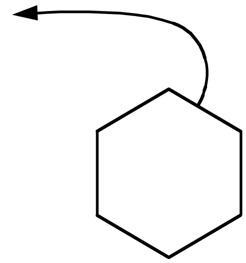
SMALL BOX-- A very small box on a pathway or on the side of a storage tank is used to initiate another circuit which is driven by "force" in proportion to the pathway or storage. This is sometimes called a "sensor" when it delivers its action without draining much energy from the original pathway or tank.



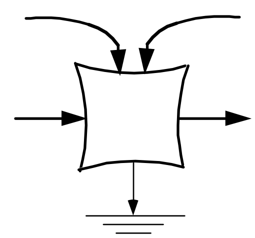
CONSUMERS-- Consumer symbols are used for units on the right side of the systems diagram that receive products and feedback services and materials. Consumers may be animal populations or sectors of society, such as the urban consumers. A consumer symbol usually implies autocatalytic interactions and storages within (Figure 2.7a). However, the consumer symbol is a class symbol (refers to many similar but different units), and details of what goes on within the consumer are not specified exactly unless more details are diagrammed inside.



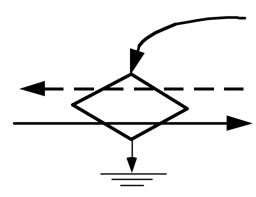
COUNTER-CLOCKWISE FEEDBACKS-- High quality outputs from consumers, such as information, controls, and scarce materials, are fed back from right to left in the diagram. Feedbacks from right to left represent a diverging loss of concentration, the service usually being spread out to a larger area. These flows should be drawn with a counterclockwise pathway (up, around, and above the originating symbol--not under the symbol). These drawing procedures are not only conventions that prevent excess line crossing and make one person’s diagrams the same as another’s, but they make the diagrams a way of representing energy hierarchies.



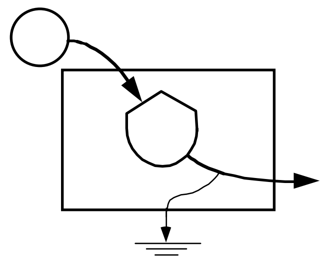
SWITCH-- The concave sided box represents switching processes, those that turn on and off. The flows that are controlled enter and leave from the sides. The pathways that control the switches are drawn to the top. This includes thresholds and other information. Switching occurs in natural processes as well as with human controls. Examples are earthquakes, reproductive actions, and water overflows of a river bank.



EXCHANGE TRANSACTION-- Where quantities in one flow are exchanged for those of another, the transaction symbol is used. Most often the exchange is a flow of commodities, goods, or services exchanged for money (drawn with dashed lines). Often the price that relates one flow to the other is an outside source of action representing world markets; it is shown with a pathway to the top of the symbol.



MATERIAL BALANCES-- Since all inflowing materials either accumulate in system storages or flow out, each inflowing material, such as water or money, needs to have outflows drawn.



Appendix A in Environmental Accounting (Odum 1996) [1]
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President's Address

This is my first message as President of ISEM. Let me begin by first thanking all who supported me in the 1998 election. I pledge to do the utmost during my tenure to prove that vote of confidence is well founded. Secondly, and more importantly, I want to thank our outgoing President, Bill Grant and Secretary-General, Ed Rykiel for their outstanding and invaluable service to ISEM. Bill, Ed, from myself and on behalf of ISEM---Thank you. You've left some big shoes to fill. It is now up to the new Executive Officers, myself, Secretary-General Wolfgang Pittroff, and Treasurer Dave Mauriello, to pick up the ball (to mix metaphors!) and continue the job of carrying ISEM into the future.

Now, to business. ISEM is still in the process of internal reorganization and transition to our new relationship with Elsevier Science BV. Former President Bill Grant outlined the main points of the ISEM reorganization in his President's Address in the September 1998 issue of ECOMOD. (That issue also contains the letter of Incorporation of ISEM and the Bylaws of ISEM, Inc.) We have made much progress in the reorganization, but work remains. Implementation of our new policy with Elsevier wherein Elsevier invoices and collects membership and subscription fees directly from members, and mails journal issues directly, has been ... bumpy. Things are improving, but are certainly not yet satisfactory (as many of you have experienced).

Be assured that we, capably led by Secretary-General Wolfgang Pittroff, are aggressively pursuing the resolution of remaining issues, "bugs" if you will, in this procedure. We ask your patience in this matter. But we also encourage you to report, to myself (awk@ornl.gov) or Wolfgang (wolfgang@stat.tamu.edu), any and all problems or concerns you encounter with billing from Elsevier, journal delivery, etc. Your feedback will help us "fix what needs fixin'".

As part of the reorganization of ISEM,

we have established three Standing Committees:

The Standing Committee on Education and Outreach; Michael Corson (m-corson@tamu.edu), Chair.

The Standing Committee on The World Wide Web and Electronic Media; Tarzan Legovic (legovic@rudjer.irb.hr), Chair.

The Standing Committee on Environmental Indices (the International Committee on Environmental Indices); Sven Jorgensen, Honorary Chair, Yuri Pykh (malkina@mail.admiral.ru), Eric Hyatt, and Roman Lenz, Co-Chairs.

These committees have been and will be charged with investigating issues relevant to the objectives and membership of ISEM and making recommendations to the Executive Officers and ISEM Board of Governors. If you are interested in volunteering for service on any of these committees please contact the respective Chairs. Likewise feel free to contact these committees with questions, concerns, or suggestions.

In particular, we are in the process of redesigning the ISEM Web site and Web services. We are, for example, considering the installation of an ISEM LISTSERV or the like to facilitate communication with and among the ISEM membership. The Standing Committee on The World Wide Web and Electronic Media is charged with making recommendations to ISEM for the redesign of the Web site and Web services. Please contact the Chair of that committee, our current Webmeister, Wolfgang Pittroff, or myself, if you have any recommendations or suggestions about the look and functionality of the ISEM Web site.

Remember, this is YOUR society. We exist as a service to the members of ISEM and to the ecological modelling and systems analysis community at large. Let us know what you want and expect from ISEM. Your communication with and participation in ISEM will make us a stronger and more effective professional society as we continue to grow ISEM into the future.

Tony King

President

Book Review

❄ *Mathematical Methods for Oceanographers: An Introduction.* LAWS, E. (1997) John Wiley & Sons, Inc., ISBN 0-471-16221-3, xii 343pp., UK& 39.95 (hard).

Mathematical Methods for Oceanographers is, overall, an excellent textbook which introduces graduate student oceanographers, professional or other interested readers, to the statistical and mathematical methods applicable to the fields of geology and chemical, biological and physical oceanography. The book closely follows a graduate course in data analysis presented to students at the University of Hawaii Oceanography Department.

A major strength of this book, is the clarity in the way that it has been written. Although the material included in the textbook is formerly an introduction to mathematical and statistical methods, the treatment of the subject matter is comprehensive and non-trivialised. It is expected that after reading the book thoroughly, a student will be armed with a strong basis and set of analysis tools and techniques with which to tackle many challenging research problems. I feel that the information contained in this book is a valuable resource for student oceanographers (and other junior scientists) and that this book should be considered as a useful possible addition to any student earth scientist's library.

The book's assumption is that the reader has a basic understanding of calculus and has had an introductory course in statistics. The book is separated into eight chapters, excluding the seven Appendices. The first chapter provides a very nice review of basic calculus, including ordinary differential equations, and also introduces functions of more than one variable and the partial derivative. Chapters 2-5 focus on fundamental statistical techniques, in particular regression analyses, and are respectively entitled "Model I Linear Regression", "Correlation", "Model II Linear Regression" and "Polynomial Curve Fitting, Linear Multiple Regression Analysis, and Nonlinear Least Squares". In geophysical work, such as various subdisciplines of oceanography, or in many other fields of scientific endeavour, regression analysis is a fundamental tool for not only estimating functional relationships between different fields, but also for prediction. Since modelling (conceptual, statistical or deterministic (primarily numerical)) and prediction are now core to all scientific endeavours, at least a basic understanding of discipline-specific modelling techniques is required of all up-coming scientists. As a data analyst, regression is the core technique and, hence, justifiably receives significant attention in this textbook.

As a reviewer of this textbook, I am very impressed with the written structure, clarity of language used and logical presentation of the material. These factors help to not only make the book very informative, but also straightforward to navigate and read. A valuable aspect of the book for earth scientists is the applicability of the information regarding, for example, the statistical techniques. In Chapter 2, the introduction to least squares is concise, appropriate and circumvents much of the less appropriate information provided in many standard statistical textbooks. Both the author's writing style and careful selection of the appropriate material, makes this textbook so valuable.

Chapters 6-8 respectively cover the topic areas of "Numerical Integration", "Box Models" and "Time Series Analysis". Chapter 6 covers the fundamentals of numerical methods including the mid-point and trapezoid rules for exact integration of linear functions, the Taylor Series expansion, Simpson's Rule for higher order integration (in particular, the exact integration of cubics), the Method of Moments, integration over time, and Runge-Kutta methods. Although this chapter is again very readable, overall there is a strong emphasis on biomathematical models, e.g., predator-prey, photosynthetic rates, etc. This obviously reflects the author's biases, as from a physical oceanography perspective, it would have been good to see numerical examples of advection and diffusion equations.

Chapter 7 introduces the reader to box models, which are again primarily associated within the areas of biomathematics and geochemistry. Half of this chapter is devoted to a geochemical dynamical box model called GEOCARB II, which has been used for examining CO_2 concentrations in the atmosphere. This is followed by a discussion of a pelagic food chain box model. The inclusion of this chapter in the textbook reflects the author's obvious interest in these types of models. As a physical oceanographer, the reviewer is less familiar with these types of models, but nonetheless found the chapter very interesting. I think that the inclusion of this chapter gives the text an interesting introduction to an area of oceanography that is rarely discussed in oceanographic textbooks and helps to make this aspect of the book a valuable addition to the literature.

Finally, Chapter 8 describes various techniques in time series analysis. The chapter first introduces the reader to deterministic and random data. Following this introduction, the chapter describes both time and frequency domain techniques. Four important factors with regards to time series data are covered in the first of these sections: these are (a) outliers (bad data), (b) stationarity, (c) periodicity, and (d) normality. Standard techniques are introduced to test for these factors. The section on frequency domain techniques is also a very valuable introduction to this topic area, which covers the basic Fourier analysis, but also the fundamental topics including convolution and aliasing. Finally, the chapter introduces the reader to the important parametric spectral analysis models, the moving average (MA) and autoregressive (AR) models, together with the combined ARMA model. From a physical oceanographer's perspective, this chapter is the most valuable in the textbook.

Challenging concepts and equations are, overall, described and presented clearly in the text. Important terms (and jargon), processes and theorems are first introduced in the text in italics. Diagrams and schematics are all clear, while statistical tables are provided as appendices. References specific to each chapter are also given and these are mostly contemporary.

One excellent aspect of the text is the provision of a comprehensive set of exercises at the end of each chapter, with worked solutions provided at the end of the book. As with all analytic work, the learning is in the doing. Here, the greatest understanding is gained by doing the exercises. Another aspect of the text that I found personally appealing, is the presentation of much of the material in terms of matrix algebra, the form that is so easily handled in the software package MATLAB.

One caveat with respect to the text, that would need to be dealt with quite carefully, is that the fairly rigorous presentation of the theory which, for the less mathematically inclined, may seem intimidating. Nevertheless, I think that providing the material is presented in such a way as to be mindful of any student limitations within a class, together with a selection of the appropriate exercises, much of any fear would likely be overcome. Also, in Chapter 8, it would have been desirable to include a brief discussion of wavelet analysis, since wavelet techniques are now becoming more widely accepted in oceanography and atmospheric science. Despite these suggestions, this book is an excellent contribution and is likely to be a valuable addition to any student oceanographer's library. This book is highly recommended.

Neil Holbrook
Macquarie University

❄ *Computer Modelling of Seas and Coastal Regions III.* Editors: JR Acinas and CA Brebbia, Computational Mechanics Publications, Southampton, 1997, ISBN: 1 85312 4990

This book contains the edited version of the papers presented at the Third International Conference on Computational Modelling of Seas and Coastal Regions, held in Spain in June 1997 and organised jointly by the Wessex Institute of Technology, UK, and the University of La

Coruña, Spain. The objective of this series of conferences has been to provide a forum for the rapid dissemination and exchange of information on seas and coastal regions and their relationship to environmental problems. This book confirms that the conference achieved this objective, with the proceedings including state of the art papers in the field.

The book contains 41 papers sub-divided into 5 sections, including:- Shallow Water Models, Tidal Simulation, Estuarine Problems, Pollutant Transport and Dispersion, Wave Propagation, Harbours and Marinas, Sediment Transport and Coastal Erosion. The proceedings start with an excellent paper on parallelising three widely used programs developed by Electricite de France, namely TELEMAC-2D, TELEMAC-3D and TOMAWAC for wave action modelling. The papers highlight how these models can be speeded up 64 fold by domain decomposition. This paper is followed by an excellent paper on the use of non-orthogonal boundary-fitting models by Barber et al. The lead author has published some impressive work in this field and this paper on wind driven circulation in the Gulf of Thermaikos is no exception. The next paper by Pearson et al cites an application of state of the art coastal and estuarine modelling using the finite volume technique on a quadtree Cartesian grid. This paper is followed by papers on longshore sedimen flux modelling, finite volume modelling of discontinuities, automatic calibration of currents and a new method to optimise vertical grid nodal placement in 3-D flows.

In the section on tidal flows the most impressive papers relate to storm-surge modelling, 3-D modelling, digital elevation modelling and high resolution frequency of tidal components in coastal currents. Likewise, in the section on Estuarine Problems, there is an excellent paper on modelling of the Rhine region of freshwater influence, with the second author being one of the elder statesman of computational hydraulics, namely Jan Leendertse.

The section on Pollutant Transport and Dispersion commences with an excellent paper by Petros Anagnostopoulos et al on coastal pollution of the Thermaikos Gulf, followed by an equally impressive paper on modelling high solute concentration gradients in coastal waters and written by Mingham and Causon from the Centre for Mathematical Modelling and Flow Analysis at Manchester Metropolitan University. Finally, in this section Giraldo and Neta of the Naval Research Laboratory present a nice paper on a comparison of Eulerian and semi-Lagrangian finite element solutions of the advective-diffusion equation.

Other papers of particular note are those by O'Connor and Nicholson from Liverpool University on sediment transport modelling and a series of papers from Spain on morphodynamic modelling, and particularly the papers from Diez of University of Madrid and Sierra et al of University of Cataluña in Barcelona.

In summary, this is an excellent book, which includes a number of state-of-the-art papers on modelling of seas and coastal regions. The book is well worth acquiring for those with an interest in the subject and for libraries where the subject is taught at MSc level or pursued for a research degree.

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Ideas/Opportunities

PROPOSED "FINITE-EARTH" SYMPOSIUM AT ISEM 1999.

The symposium " Finite-Earth Energy Analysis" at ISEM-ESA in Baltimore in August, 1998 was successful in attracting interest (ca. 70 in audience) and highly stimulating. I hope to continue this idea next year at ISEM-ESA in Spokane, with a symposium entitled "Finite-Earth Modelling" or the equivalent. Back-to-back efforts, just as back-to-back meetings with ESA, will enhance the effort. The basic idea is to identify and present work which incorporates appropriate physical -biological limits to the size of the human endeavor and creative responses to the problems that growth is traditionally thought to solve.

Two points drive my interest.

1. The forces for growth depend strongly on equity issues among and inside nations.
   a) In developed countries: Some people don't have any sense of limits. Most people do. Of these, a smaller group don't care because they are highly competitive, often risk-taking, and want it all, anyway. A larger group are somewhat cooperative, risk-averse, and don't want (much) more. But...they do not want less, and they sense viscerally that limits implies redistribution, which implies less for them.
   b) In developing countries: Competitive class as above. The rest have valid desires for a higher material living standard and realize that without growth, redistribution is the only way to get it. They know how difficult redistribution is to accomplish, and anyway, it is demeaning. So they also want growth.
1. ISEM members represent a large pool of expertise to make contributions to quantifying answers to questions the above points imply. I hope that ISEM members will direct more of their work towards these questions.

Below is a tentative, incomplete, list of issues. Most are given in rather stark terms, but there are positive and joyous ways to present them:

- Timing and sequencing: minimizing costs of haste. Examples: energy development and transportation development in DCs.
- Costs of big geographic cycles in food and other supply: can reducing these benefit "everyone"? (Average American food item travels 1200 miles)
- Believable indicators for development. (ISEW, Green GDP, index of social health...)
- Tradeoff between growth and redistribution: what makes it less stark?
- Global bookkeeping: can everyone import resources and export jobs and environmental impacts?
- International vs. local trade: what are the benefits and costs, specified with respect to timing and to recipients.
- Quantifying the Precautionary Principle: what are costs and risks of going slowly?
- Marginal/average pricing thinking: what is the proper way for the message of limits to be transmitted?
- Instability. Tragedy of the Commons-type models. Conspiracy. What about alpha corporations?
- How does the message/policy change with constituency: Haiti? China? Malawi? Russia? New Jersey?
- Rebuilding fisheries: what wait is

enough?

- Durability in housing and consumer goods: Benefits and implementation.
- Momentum and lags: How to deal with infrastructure lifetimes of 50 years or more?
- Transportation and mobility: Are there really alternatives/what measures are needed to effect them?
- Where are simple back-of-envelope calculations useful, and where are they misleading?
- Human population: What is carrying capacity of your region/globe?. What is consequence of increasing/decreasing migration. What are consequences of NPG or ZPG on social service requirements, etc.?

I solicit volunteers and suggestions for the "Finite-Earth Modelling" symposium in Spokane.

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INTEGRATION OF ECOLOGY WITH HUMAN DEMOGRAPHICS AND SOCIOECONOMICS: MODELING ECOLOGICAL EFFECTS OF HUMAN FACTORS

The Editor-in-Chief of "Ecological Modelling" has asked Jianguo (Jack) Liu to edit a special issue on integrating ecology with socioeconomics and human demographics. This special issue will focus on modeling and simulating the effects of human factors (e.g., population, household, attitude, perceptions, needs, activities) on structure, function, integrity, and dynamics of biological populations, communities, ecosystems, landscapes, biosphere, natural resources, and/or biodiversity. The deadline for manuscript submission is February. 28, 1999. All manuscripts will be peer-reviewed. Interested colleagues are welcome to contact Jianguo (Jack) Liu for more information about contributions to this special issue.

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Note from the Editor

In Last ECOMOD we announced that part II of the contribution by J. Benz, R. Hoch, and T. Gabele: “Standardization of Model Documentation” would be in this issue. Unfortunately, the authors have been busy with other commitments. We hope to publish it in our next issue.

ECOMOD needs a new editor: This is a good opportunity to get actively involved. Please nominate yourself or another member who would like to bring new ideas to this newsletter and the society in general. The editor is appointed by the board based on the nominations. Please send your nomination to Tony King, President or Wolfgang Pittroff, Secretary General. The new editor will start producing ECOMOD after our meeting in 1999.

We are always looking for contributions to ECOMOD. We need to get articles for the Perspectives section, book reviews (did you read a book or evaluate software that you liked and want to share your opinion with other members?), notes from the officers, from the members, future meetings, ideas, opportunities… All are welcome.

Ellen Pedersen
Editor

Welcome New Members

In 1998 several new members from 16 different countries have joined ISEM

Pedro M. Anastacio, Portugal
Luciano Babos, Italy
Dalius Balciunas, Lithuania
Randy G. Balice, USA
Helmut Baumert, Germany
Joachim Benz, Germany
Kathleen M. Bergen, USA
Amedeo Bozzani, Italy
Deirdre. H. Carlson, USA
Barney Caton, USA
Viktor N. Chukanov, Russia
Donald F. Clark, Canada
Antonio Christofoletti, Brazil
William S. Currie, USA
Donna J. D'Angelo, USA
Colin Daniel, Canada
Karine Gil de Weir, Venezuela
Tiago Domingos, Portugal
Daniel Druckenbrod USA
Erle C. Ellis, USA
R. Andres Ferreyra, Argentina
James Fitzpatrick, USA
Daniel J. Gefell, USA
John M. Goodburn, USA
Shreeram Inamdar, USA
K. Bruce Jones, USA
Tim Kedwards, UK
Wolfgang Koehler, Germany
Boris A. Korobitsin, Russia
Charolette Lagerberg, Sweden
Bin-Le Lin, Japan
Jay Martin, USA
Mark Meleason, USA
Ali T. Naghyiev, Azerbaijan
Takehashi Okunishi, Japan
Ludmilla B Pachepsky, USA
Joze Panjan, Slovenia
James V. Rauff, USA
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Masaki Sagehashi, Japan
Ralf Seppel, Germany
Seok Soon Park, Korea
Chris Topping, Denmark
Angel Utset, Cuba
Hong-Qinq Wang, USA
Enrique Weir, Venezuela
Michael C. Wimberly, USA
Chen-Hsiang Yeang, USA

Welcome to ISEM, and thanks for joining ISEM, a growing international community. We are looking for forward to meeting you in person at our next conference.

Publication Information

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Submission deadline for next ECOMOD:
February 1, 1999

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