Beroggi writes well and his illustrations are excellent. There are plenty of numerical examples, but the book sorely lacks a few strong case studies to pull the ideas together. Surprisingly, given the emphasis on information systems issues in his objectives, there is relatively little on computing and human computer interfaces. For the student there are a range of problems and worked solutions.

The sad thing is that while Beroggi has written a valuable textbook, Kluwer, his publishers, have followed their standard pricing policy and ensured that only well funded libraries can afford a copy. At nearly £100 neither lecturers nor their students will be buying personal copies. Given that the book appears to have been produced from camera-ready copy, the price seems even more unjustified. Certainly, my advice is that if you have £100 to spend on decision modelling and analysis reading, then it is possible to buy a portfolio of two or thee books covering much the same material and still have change. So, if your library has spare funds, order a copy of this text. But I cannot recommend that lecturers and students buy a copy because of the inflated numerator in the cost/benefit ratio.

Manchester Business School S French

Systems Analysis and Modeling: A Macro-to-Micro Approach with Multidisciplinary Applications

DW Boyd

Academic Press, 2001. xi + 365 pp. USD 79.99.
ISBN: 0 12 121851 1

Journal of the Operational Research Society (2002) **53,** 1398. doi:10.1057/palgrave.jors.2601465

I guess it was the words "system", "modelling" and "multidisciplinary" in the title that caught my eye and led me to review this book for JORS. As sometimes happens the title conveyed to this potential reader something that does not match up with the actual content. This is not to say the content is not appropriate to the intended audience, just different from what I anticipated! I was not expecting the book to focus on such a hard-edged modelling approach. The book is aimed primarily at third level engineering students and provides a methodology for analysing situations and constructing models whose numerical behaviour can be established formally and accurately. A good background of quantitative work, two-year's study at undergraduate level, is declared as a prerequisite to applying the substance in the text. To convey the material the author adopts an out and out didactic style without any embellishments; indeed the author states his intention to omit "bell or whistles".

In this first edition text the author presents an approach stemming from research that he carried out in the early seventies and then developed and tested over a number of years of teaching to engineering students. The "Mtm" methodology is, as the comment "Macro-to-micro" in the title implies, a top-down approach for modelling a hierarchical set of linked models. However, it is worth observing that the hierarchical claim is not really illustrated in that the examples provided dwell on single level models. The Mtm approach is offered in contrast to conventional micro-to-Macro (mtM) approaches that start with differential equations that necessitate integration, often by making simplifying assumptions that lead to approximation errors. At the heart of the Mtm approach linear (continuity or balance) equations are employed with linear dynamic forms to model non-linear as well as linear systems in a way that avoids such approximation errors.

The book is structured in three main parts. Part one, consisting of three chapters, comprises a no-nonsense introduction to the author's approach to systems analysis and modelling. This appears clearly explained although the basis for the method has, in the main, to be taken on trust. The method itself looks to have some interesting aspects. The second part (four chapters) and third part (six chapters) concentrate on applying the approach respectively to deterministic and stochastic situations through a variety of examples. The examples contained in these application chapters are mainly drawn from physics, mechanics and environmental science; however some management and business applications are present. Appendices A through to J are appended at the end of the relevant, more quantitative chapters and an instructor's manual is available. Fifty-eight references are included at the back of the book, along with a glossary of terms and an index.

Surprisingly the book makes no direct references to, or comparisons with, building models in system dynamics software. As an exercise I programmed the introductory example from the book, population growth, in Vensim^{TM}. This took less than ten minutes to construct the model and collect results. These detailed numerical results differed from those in the book for the fifth significant digit, a deficiency that the author could point to as a justification for using his method. Clearly some situations require the level of precision that the author's method delivers while others do not. It is not that clear to me that many situations in business and economics fields require such precision in mapping modelled behaviour to actual; therefore more accessible methods such as visual interactive modelling do not seem in danger of being supplanted by Boyd's methodology. Notwithstanding this point, the book offers a systematic modelling approach that could form a useful complement to many of the other tools in the model builder's tool kit. For this reason I would not strongly object to the claim: "The book should be on the desk of anyone engaged in building systems models and especially those in engineering, business, economics, biology, agriculture, and federal agencies". The clear caveat I would add is the need for the modeller to be decently numerate to apply and benefit from the approach.

Leeds University Business School TF Burgess