



## Mathematics and Politics: Strategy, Voting, Power and Proof (Textbooks in Mathematical Sciences)

By Alan D. Taylor

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interest in a particular application, however, often depends on his or her general interest in the area in which the application is taking place. My experience at Union College has been that there is a real advantage in having students enter the course knowing that virtually all the applications will focus on a single discipline—in this case, political science. The level of presentation assumes no college-level mathematical or social science prerequisites. The philosophy underlying the approach we have taken in this book is based on the sense that we (mathematicians) have tended to make two errors in teaching non-science students: we have overestimated their comfort with computational material, and we have underestimated their ability to handle conceptual material. Thus, while there is very little algebra (and certainly no calculus) in our presentation, we have included numerous logical arguments that students in the humanities and the social sciences will find accessible, but not trivial. The book contains five main topics: a model of escalation, game theoretic models of international conflict, yes-no voting systems, political power, and social choice. The first part of the text is made up of a single chapter devoted to each topic. The second part of the text revisits each topic, again with a single chapter devoted to each. The organization of the book is based on pedagogical considerations, with the material becoming somewhat more sophisticated as one moves through the ten chapters. On the other hand, within any given chapter there is little reliance on material from earlier chapters, except for those devoted to the same topic.

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## **Editorial Review**

### Review

From the reviews of the second edition:

“Mathematics and Politics is the fruit of undergraduate mathematics courses taught by the authors. The primary audience is political and social science majors. ... The writing style is appropriate for the intended audience with the understanding that the students/readers have some familiarity with political science economics or sociology. ... Overall the book serves as a useful quantitative introduction to several of the covered topics. ... Faculty in the social sciences should strongly consider Mathematics and Politics as a resource/reference.” (J. Douglas Barrett, *Technometrics*, Vol. 53 (1), February, 2011)

“It is intended to serve as a text for social science and humanities students that will highlight the power and utility of mathematics. ... if you are considering a course as described above, this textbook deserves to be the one that will entice you into taking the plunge. And if you simply want to educate yourself in areas of social science mathematics that have only recently started to get the attention they deserve, Mathematics and Politics deserves your strong consideration.” (Edward W. Packel, *SIAM Review*, Vol. 52 (4), 2010)

### From the Back Cover

Mathematics and Politics requires no prerequisites in either subject. The underlying philosophy involves minimizing algebraic computations while focusing on the conceptual aspects of mathematics in the context of real-world questions in political science. This new addition has an added co-author, Allison Pacelli, and covers six major topics: social choice, yes-no voting systems, political power, game-theoretic models of international conflict, fairness, and escalation. In addition to having two new chapters (treating apportionment and conflict resolution), the text has been extensively reorganized and the number of exercises increased to over 300.

## **EXCERPTS FROM REVIEWS OF THE FIRST EDITION**

"Taylor has done a remarkable job of showing the power of deductive reasoning in ... the strategic choices actors make in conflict situations ... a penetrating analysis of both real-life and hypothetical situations."

-- Steven Brams, New York University

Alan Taylor's book is carefully crafted. He is ever aware of his audience, but relentlessly presses the beginning student to understand more and more."

-- Samuel Merrill III, *American Mathematical Monthly*

This book is a unique and valuable source ... Coverage is thorough and extensive; ideas are explained clearly and at an appropriate mathematical level."

-- Ed Packel, Lake Forest College

"... Mathematics and Politics is a nearly perfect solution, either for classes or for the serious professional who wants to retool. ... The writing is crisp, and the sense of excitement about learning mathematics is seductive."

-- Michael Munger, Chance

" I like this book. It's nice mathematics with serious applications."

-- John Ewing, Indiana University

"Now we have, in Alan Taylor's book, an introduction to these ideas that is delightfully lucid and requires almost no mathematical prerequisites."

-- Phillip D. Straffin, College Mathematics Journal

"[The book] breaks new ground and could stand as the definitive undergraduate textbook in this area for quite some time."

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### **From reader reviews:**

#### **Sheila Rocha:**

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