

BOOK REVIEWS

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Guesstimation 2.0 by L. Weinstein
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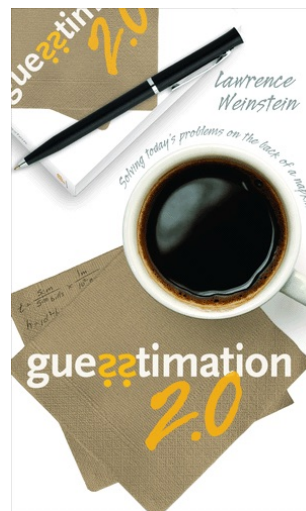
Lawrence Weinstein is a physics professor at Old Dominion University, Norfolk, Virginia. He works at a particle accelerator to discover how matter is composed. Based on his personal experience as a teacher using a problem based approach, he has already published a first *Guesstimation* book in 2008. With a self-explanatory title, the readers of *CruX* will have guessed (pun intended) that the aim of the book is coming up with rough solutions that are part guess and part estimation, but doing so in as rigorous a way as possible.

Problem solving is the name of the game, but problem solving can mean a lot of things to a lot of people. Lawrence Weinstein's take on it as a physics professor is that you can solve a lot of real-life situations with the use of mathematics. The thesis underpinning the technique of guesstimation is that the situation in which the problem arises might not even need to be fully mathematicised to be solved by mathematics. To give an example of the situations covered, we can look at the table of contents:

1) How to solve problems, 2) General questions, 3) Recycling: what really matters?, 4) The five senses, 5) Energy and work, 6) Energy and transportation, 7) Heavenly bodies, 8) Materials, 9) Radiation, and 2 appendices. We can see from the titles that the first 6 chapters are aimed at laypersons and the last 3 are targeting a more scientific audience, but things

aren't that simple. A lot of the questions have a humorous bent to them. Most problems also seem to have a second purpose, which is to help the reader get a better sense of our environments. Each chapter contains between 8 and 16 situations (I'll let you guesstimate how many are in total in the book). The first appendix aims to develop the number sense in the reader, while the second one gives a list of common things and their respective orders of magnitude, which are used to guesstimate various quantities in the book, but also to give concrete tools to permit the readers to practice guesstimating.

The approach taken is to create reasonable solutions and give an interval in which one has a good chance of finding the solution. The whole gist of the book is that these rough approximations are usually enough in a concrete and real life situation to function. The approach is not statistical so one cannot talk about quantifying



risk of making an error. A fact I particularly enjoyed was that the whole technique is based on the geometric mean, which in my opinion is under-taught and under-used.

To get a better feel for the book, here are some questions posed and then answered in the book :

- How much does a trillion dollars weigh?
- Which has more mass, the air or the brains in a movie theatre?
- What is the maximum amount of light that our eyes can tolerate, even briefly?
- How fast would the sun rotate if it collapsed into a neutron star?
- What the maximal height a mountain can have on earth? (rephrased)

Maybe my favourite ones are the problems on recycling where the author compares different ways of proceeding or answers indirectly under what conditions recycling is worthwhile.

The readers of *CruX* , all problem solvers themselves, will appreciate the medley of situations where their art is applied in this book, as well as the tricks used to solve them. I wonder how many will appreciate the messiness of the solutions. A lot of our younger readers will surely jump at the chance of seeing mathematics applied in the concrete world, especially with the irreverent tone given to many problems posed. Good reading!

