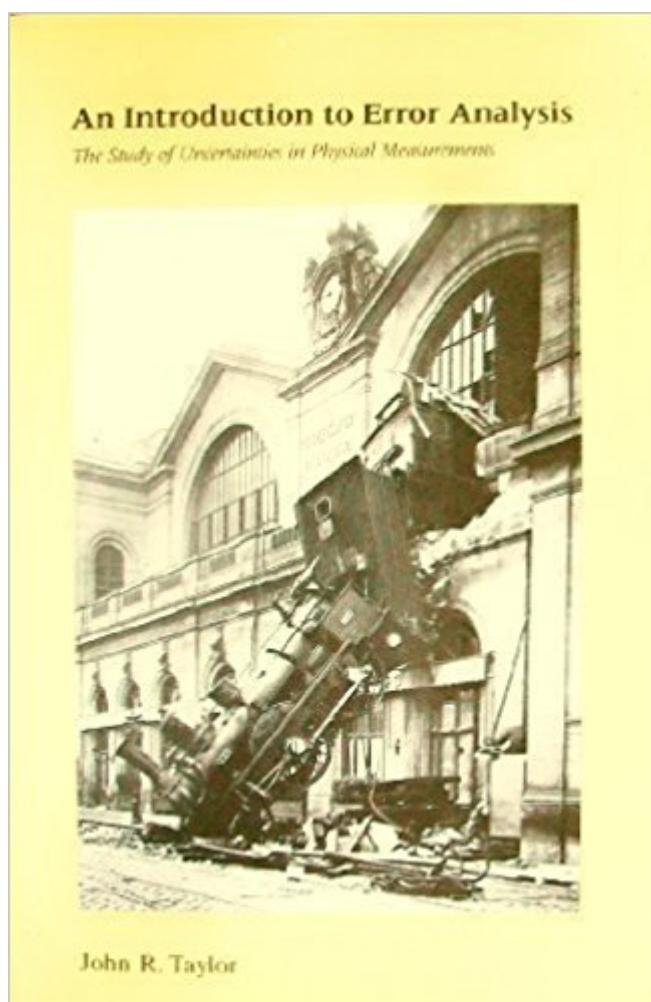


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# Introduction To Error Analysis: The Study Of Uncertainties In Physical Measurements (Series Of Books In Physics)



## **Synopsis**

This best-selling text by John Taylor, now introduces the study of uncertainties to lower division science students. Assuming no prior knowledge, the author introduces error analysis through the use of familiar examples ranging from carpentry to well-known historic experiments. Pertinent worked examples, simple exercises throughout the text, and numerous chapter-ending problems combine to make the book ideal for use in physics, chemistry, and engineering lab courses. The first edition of this book has been translated into six languages.

## **Book Information**

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## **Customer Reviews**

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To be honest, I bought this for the cover, but the material inside is worth a skim for us non-engineers. I may not understand all the math or theory, but it is interesting to see the kind of decisions engineers and designers have to struggle with it. A refreshing change from the usual "Is it safe?" discussion, and rather "How can we make this as safe as possible and still

usable/affordable?".

Product as described, delivered quickly.

This book is chock full of error and how to calculate it. Best part is that the book is dedicated to the guys wife.. ouch.

But how much is 'a little'? I first encountered this book when I was a physics and astronomy major in college, a major that changed over time to include mathematics proper, then political science, then other humanities such as religious studies, history and philosophy. Strange as it may seem, this text has been one of the few constants that has been helpful in almost every field. For physics and any of the natural sciences, the content of this book is highly necessary - be in chemistry, physics, astronomy, geology, or biology, all sciences depend upon observation and analysis, both of which are far from perfect. The task of ever-increasing observational and analytical precision is both an art and a science in and of itself, and one of the tasks of any scientist is to discover where errors might lie. Interestingly, this also occurs in political science and sociology, economics and history, and even philosophy (logic can incorporate ideas from error analysis, as can epistemology). Error analysis is primarily a statistical tool, and those who have had statistics will find this very familiar. The first part of the book is very simple - Taylor assumes no background, so gives an introduction to the simple reading of charts, graphs, scales and other such things, with plenty of examples. He talks about estimating, significant figures, fractional uncertainties, and how uncertainties can accumulate. How can  $2 + 2 = 5$ ? Well, if you round to the highest or lowest whole number, 2.49 and 2.49 will both be rounded down to 2 (under many normal rounding procedures), yet if the underlying calculation or data include the 'real' information,  $2.49 + 2.49$  in fact equals 4.98, very close to 5. If you think that's confusing, you ain't seen nothing yet... Taylor's first part concludes by looking at the basics of simple statistical analysis - standard deviations, normal distributions, justification of the mean as best estimate, and a brief introduction to the concept of confidence. Part two gets into more detailed analysis, including least-squares fitting, correlation coefficients, binomial distributions, Poisson distributions, and the chi-squared test. The mathematics requirement goes up as the chapters progress - the early chapters only require an elementary knowledge of algebra; as the text continues, knowledge of differentiation, integration and exponential functions are necessary. A first-year course in calculus should be sufficient for easy understanding here; it is possible to get through the material without this background, but it will be more difficult. This text is designed to be a self-study for the

students; it can be introduced in lectures prior to lab work, but can also be used easily for the independent reader to understand. This book is really intended for the physical scientist - most of the examples come from problems in optics or mechanics (physics problems). Useful, helpful, and a good introduction to error analysis. Read and understand.

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