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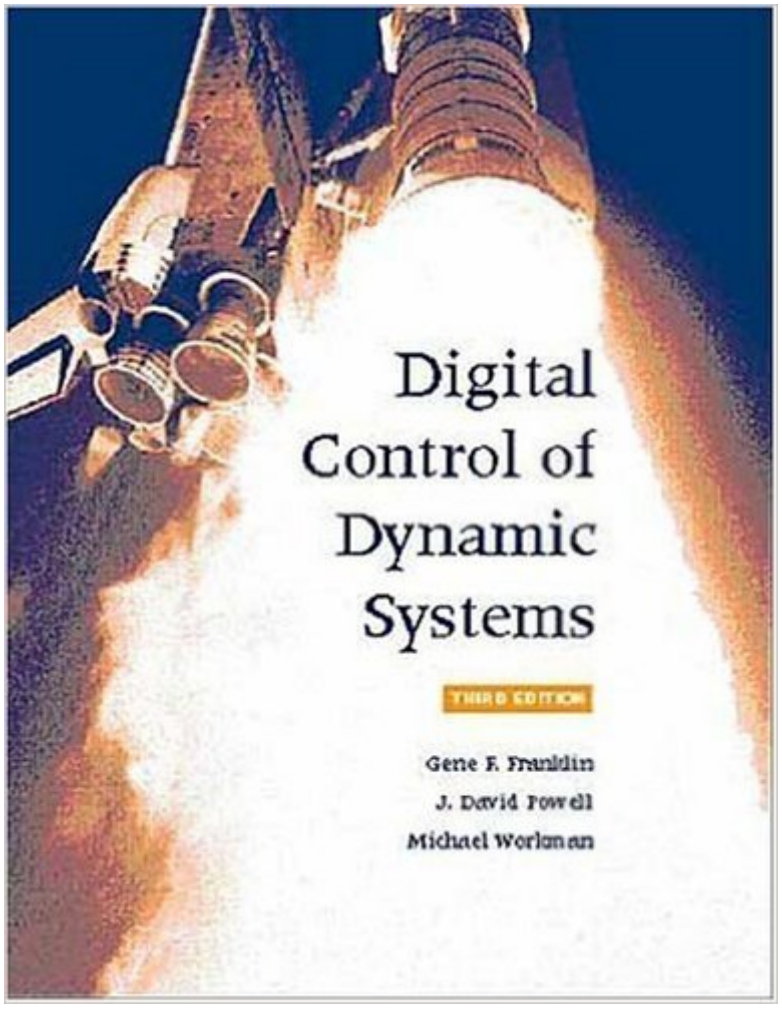
Digital Control Of Dynamic Systems (3rd Edition)



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Synopsis

This well-respected, market-leading text discusses the use of digital computers in the real-time control of dynamic systems. The emphasis is on the design of digital controls that achieve good dynamic response and small errors while using signals that are sampled in time and quantized in amplitude. Both classical and modern control methods are described and applied to illustrative examples. The strengths and limitations of each method are explored to help the reader develop solid designs with the least effort. Two new chapters have been added to the third edition offering a review of feedback control systems and an overview of digital control systems. Updated to be fully compatible with MATLAB versions 4 and 5, the text thoroughly integrates MATLAB statements and problems to offer readers a complete design picture. The new edition contains up-to-date material on state-space design and twice as many end- of-chapter problems to give students more opportunities to practice the material.

Book Information

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Customer Reviews

Generally an excellent book with many worked examples. Unfortunately there seem to be a few irritating errors. One error concerns section 13.3.1. The cost function in this example is set for a bandwidth of 1Hz. This is also indicated in Figure 13.70. However, the parameters a,b given in Figure 13.71 (and those found by the search algorithm) are correct for a bandwidth value of 10Hz. Incidentally, the third edition (student edition) of the book seems to be made of thinner paper than the second edition. I feel the book makes rather too much of quantisation effects and sample rate

selection. It might be better to replace these chapters with a new chapter on model predictive control.

I'am primarily a VLSI design engineer who is working on a product involving digital control. The book by Franklin and co. helped me get off to a quick start. It has a lot of practical examples which will be useful to engineers. It teaches the underlying theory , proposes a method to solve problems and also gives the appropriate MATLAB commands. However , personally I'am not able to get a solid grasp of the material by reading this book alone. For a more complete and rigorous coverage I recommend Discrete Control by Benjamin Kuo.

This is a very nice introduction to the topic of sampled-data control systems. On the positive side, the authors often appeal to the reader's feeling for engineering problems. This is very useful and serves as a motivation for students in general. The discussions are clear, nomenclature is not hard to follow and there are plenty of worked examples. The book covers discretization effects and design by emulation (i.e. design of continuous-time control system followed by discretization before implementation) which are not to be found on every book on digital control. On the negative side is the organization of the material. It is not clear what kind of path the authors have in mind. Also there are omissions that are hard to justify. This thick book, when it comes to determining the stability of a characteristic polynomial in the z variable, just says that the bilinear transformation can be used in conjunction with the Routh-Hurwitz criterion. None of Jury's stability tests are described at all (I wonder if it is because Jury was Franklin's colleague during their doctorates...). The book is crowded with references in the text that are not to be found in the list of references. If you are interested in the modified z transform, you must choose another book. Coming back to the positive side, the chapter on control systems design in the frequency domain is a great exposition on the philosophy of control design, clear, thorough (the author even mention Bode's integral, a rare thing to do nowadays) and provides lots of insight in what concerns robustness. In summary, a great book, but as an introductory text-book it lacks some key-topics.

This book is a very nice one among those on the same topic. It covers all theory that we should know about digital control in addition to a neat review of continuous control. Besides, it provides insight for understanding real systems along with Matlab examples and good problems. The way the authors wrote the book is clear and and in turn they offer the reader a pretty good and comprehensive approach. I recommend it!

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