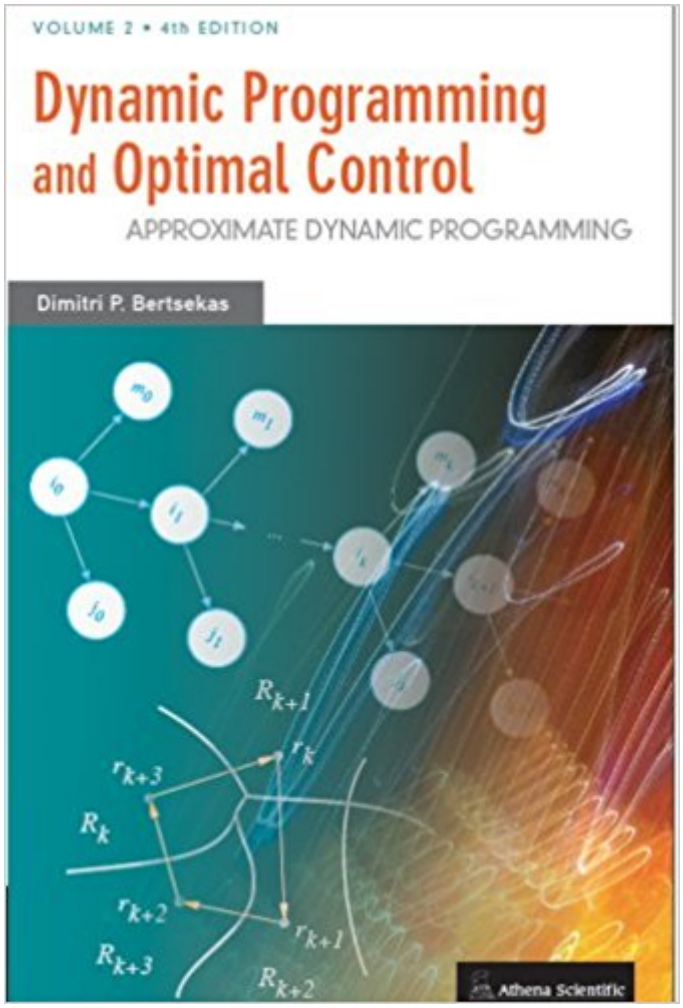
# Dynamic Programming And Optimal Control (2 Vol Set)



## Synopsis

A two-volume set, consisting of the latest editions of the two volumes (4th edition (2017) for Vol. I, and 4th edition (2012) for Vol. II). Much supplementary material can be found at the book's web page. The first volume is oriented towards modeling, conceptualization, and finite-horizon problems, but also includes a substantive introduction to infinite horizon problems that is suitable for classroom use, as well as an up-to-date account of some of the most interesting developments in approximate dynamic programming. The second volume is oriented towards mathematical analysis and computation, treats infinite horizon problems extensively, and provides a detailed account of approximate large-scale dynamic programming and reinforcement learning. This is a textbook on the far-ranging algorithmic methododogy of Dynamic Programming, which can be used for optimal control, Markovian decision problems, planning and sequential decision making under uncertainty, and discrete/combinatorial optimization. The treatment focuses on basic unifying themes, and conceptual foundations. It illustrates the versatility, power, and generality of the method with many examples and applications from engineering, operations research, and other fields. It also addresses extensively the practical application of the methodology, possibly through the use of approximations, and provides an introduction to the methodology of Neuro-Dynamic Programming, which is the focus of much recent research.

## Book Information

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## Customer Reviews

Review of Vol. I, 3rd Edition: In addition to being very well written and organized, the material has several special features that make the book unique in the class of introductory textbooks on

dynamic programming. For instance, it presents both deterministic and stochastic control problems, in both discrete- and continuous-time, and it also presents the Pontryagin minimum principle for deterministic systems together with several extensions. It contains problems with perfect and imperfect information, as well as minimax control methods (also known as worst-case control problems or games against nature). I also has a full chapter on suboptimal control and many related techniques, such as open-loop feedback controls, limited lookahead policies, rollout algorithms, and model predictive control, to name a few. ... In conclusion the book is highly recommendable for an introductory course on dynamic programming and its applications. --Onesimo Hernandez Lerma, in Math ReviewsIn this two-volume work Bertsekas caters equally effectively to theoreticians who care for proof of such concepts as the existence and the nature of optimal policies and to practitioners interested in the modeling and the quantitative and numerical solution aspects of stochastic dynamic programming. --Michael Caramanis, in InterfacesIn conclusion, this book is an excellent source of reference ... The main strengths of the book are the clarity of the exposition, the quality and variety of the examples, and its coverage of the most recent advances. --T. W. Archibald, in IMA Jnl. of MathematicsIn this two-volume work Bertsekas caters equally effectively to theoreticians who care for proof of such concepts as the existence and the nature of optimal policies and to practitioners interested in the modeling and the quantitative and numerical solution aspects of stochastic dynamic programming. --Michael Caramanis, in InterfacesIn conclusion, this book is an excellent source of reference ... The main strengths of the book are the clarity of the exposition, the quality and variety of the examples, and its coverage of the most recent advances. --T. W. Archibald, in IMA Jnl. of Mathematics

Dimitri Bertsekas is Professor of Electrical Engineering and Computer Science at the Massachusetts Institute of Technology, and a member of the US National Academy of Engineering. He is the recipient of the 2001 A. R. Raggazini AACC education award, the 2009 INFORMS expository writing award, the 2014 Kachiyan Prize, the 2014 AACC Bellman Heritage Award, and the 2015 Dantzig Prize. He has researched a broad variety of subjects from optimization theory, control theory, parallel and distributed computation, systems analysis, and data communication networks. He has written numerous papers in each of these areas, and he has authored or coauthored sixteen textbooks.

I’ve read the textbook dealing with DP up to chapter 6. Since this book is approached mathematically, I think it is very well made except a few typos. A bit of unsatisfactoriness for me is

the style of the book. I prefer the style introducing the general result first, and then proves why they are derived and where they are derived from. And then, many examples are very helpful for readers like me. However, this book introduces examples first, and then constructs the general form from and using the examples. I am sure that everybody has different styles. My word is just not my type. Nevertheless, the contents that textbook handles are wonderful.

After having been exposed to (and purchased) a number of books by Dr. Bertsekas on an eclectic array of topics, I have little doubt about his superb acumen and mastery of many, many subject areas involving applied mathematics. This book is no exception. Further, the legibility of Bertsekas' books score much higher the other two members of the GMTM (the Greek Math Triad of MIT), namely Bertsimas and Tsitsiklis, whose writings are highly esoteric in the purest form of the Archimedian tradition.However, despite applaudable efforts to make the book more accessible to those on a lower IQ scale than the top-shelf MIT doctoral students, Bertsekas' 2-volume set on DP & Optimal Control still falls short in two key areas: (1) Visualization; and (2) Inconsistency in flow.Being a product of the multi-media era, I and many of my fellow students are highly-dependent on visualization tools. In my opinion, what is NOT conveyed through lines and lines of cryptic (and author-specific) symbolism and mathematical formulation CAN be effectively conveyed through the strategic (and reasonably-ample) use of graphs and diagrams. Once the reader has a general idea of the gist of the concepts, then the specifics can be stated using precise mathematical language. But until then, the formulations are subject to open and erroneous interpretation (much the same way that few students are able to decipher the true essence of Symphony No. 40 by merely staring at the musical notes on sheets of paper). A picture is worth a thousand Greek symbols.Inconsistency in flow refers to the fact that certain basic concepts are overstated in the book, while some of the more critical concepts (particularly those involving not-so-obvious algebraic steps in the proofs) are deemed "trivial" by the author, and apparently skipped for the sake of keeping the book to a manageable size. My suggestion is to err on the side of over-inclusion by keeping the proofs to a minimal in the actual text, but making the proofs (with all "trivial" elaborations) available online through the publisher's website (or via an included CD-ROM).The aforesaid aside, the book is one of the best efforts in providing a comprehensive and modern analysis of DP/MDP, and its later editions do have the potential to claim 4.5-5 stars. In the interim, I recommend Powell's Approximate DP book as a less painful way of learning what I personally consider to be one of the most important topics in combinatorial optimization.

Well, I have not gotten any time to read it. But it’s classical. The best.

The book could be clearer with the notations and may be pictorial when changing them for a section or when overloading of the variable. Otherwise a very good book.

Easy to follow text, lots of useful examples, sets you up to use dynamic programming for lots of everyday problems.

This book has so many unnecessary material in it. This makes you tired if you want to read it as your course book. I think Bertsekas, is more busy to write as many as book he can instead of making them readable.

The author is one of the best-known researchers in the field of dynamic programming. He has produced a book with a wealth of information, but as a student learning the material from scratch, I have some reservations regarding ease of understanding (even though the author does provide a lot of examples in the text).For example, algorithms (even short ones like label correction) may be quite informally stated, with certain important details only mentioned on later pages, thus lacking concision and the clean feel of a CS algorithms book.Second, theorems (take e.g. the HJB sufficiency theorem on deterministic continuous time optimal control) can be very wordy yet at the same time lacking the last bit of precision in notation, thereby blurring the result.Third, while reading, I sometimes felt left alone structuring topics, organizing thoughts, and trying to figure out where things were going. In my opinion, the author could have tried harder to present a big picture of the different aspects (discrete vs. continuous dynamics, finite vs. infinite horizon, randomized vs deterministic perturbations) and thus help better situate the topics of the various chapters and subsections.Last, there is a lack of solutions for the serious examples appearing in the exercises at the end of each chapter. There are some solutions on the publisher’s web site, but not more than perhaps 20-30% of the exercises are solved. This is really a pity because these are good problems with a lot of insight to gain from.All in all, I find the book a bit hard to learn from. Personally, I’d like it to be a little more student-friendly.

This book is written for the mathematically inclined. If you have a solid background already, and want to deepen your understanding then this is the book for you.

Dynamic Programming and Optimal Control, Vol. II, 4th Edition: Approximate Dynamic Programming Dynamic Programming and Optimal Control (2 Vol Set) Dynamic Programming and Optimal Control, Vol. I, 4th Edition Python Programming: Python Programming for Beginners, Python Programming for Intermediates, Python Programming for Advanced C++: The Ultimate Crash Course to Learning the Basics of C++ (C programming, C++ in easy steps, C++ programming, Start coding today) (CSS,C Programming, ... Programming,PHP, Coding, Java Book 1) NLP: Neuro Linguistic Programming: Re-program your control over emotions and behavior, Mind Control - 3rd Edition (Hypnosis, Meditation, Zen, Self-Hypnosis, Mind Control, CBT) NLP: Persuasive Language Hacks: Instant Social Influence With Subliminal Thought Control and Neuro Linguistic Programming (NLP, Mind Control, Social Influence, ... Thought Control, Hypnosis, Communication) Let's Grill! Best BBQ Recipes Box Set: Best BBQ Recipes from Texas (vol.1), Carolinas (Vol. 2), Missouri (Vol. 3), Tennessee (Vol. 4), Alabama (Vol. 5), Hawaii (Vol. 6) C++ and Python Programming: 2 Manuscript Bundle: Introductory Beginners Guide to Learn C++ Programming and Python Programming C++ and Python Programming 2 Bundle Manuscript. Introductory Beginners Guide to Learn C++ Programming and Python Programming Python Programming: The Complete Step By Step Guide to Master Python Programming and Start Coding Today! (Computer Programming Book 4) Modelling and Control of Dynamic Systems Using Gaussian Process Models (Advances in Industrial Control) Decoding The Hidden Market Rhythm - Part 1: Dynamic Cycles: A Dynamic Approach To Identify And Trade Cycles That Influence Financial Markets (WhenToTrade) Decoding The Hidden Market Rhythm - Part 1: Dynamic Cycles: A Dynamic Approach To Identify And Trade Cycles That Influence Financial Markets (WhenToTrade) (Volume 1) Python Programming Guide + SQL Guide - Learn to be an EXPERT in a DAY!: Box Set Guide (Python Programming, SQL) Modeling Dynamic Biological Systems (Modeling Dynamic Systems) Dynamic Modeling in the Health Sciences (Modeling Dynamic Systems) NLP: Neuro Linguistic Programming: Re-Program Your Control over Emotions and Behavior, Mind Control, 3rd Edition Nlp: Neuro Linguistic Programming: Re-program your control over emotions and behavior, Mind Control Master Your Mind: Achieve Greatness by Powering Your Subconscious Mind [mental power, mind control, thought control] (brain power, subconcious mind power, NLP, Neuro Linguistic Programming)