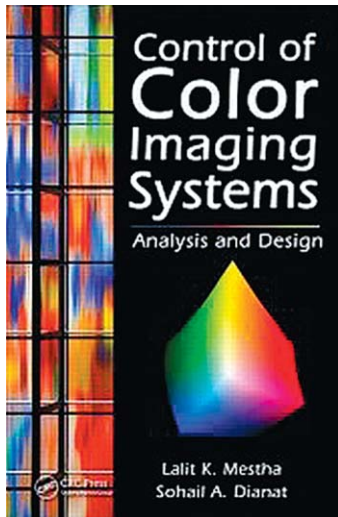


## Control of Color Imaging Systems: Analysis and Design

Lalit Mestha and Sohail Dianat, 680 pp., ISBN 978-0-849-33746-8, CRC Press (2009), \$144.95 hardcover.

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This is the first book that brings together the technical fields of imaging systems and feedback control systems in a self-contained manner. The book starts by introducing the basic building blocks of both technical fields, and then introduces the reader to the most common problems and their state-of-the-art solutions. Generally speaking, these problems are motivated by practical issues found in color-printing systems. Control theory provides a common set of tools to solve these problems. The

practical root of the problems and the academic rigor of the proposed solutions are presented throughout the book. The structure of the book comes naturally given the backgrounds of the book's authors. One author possesses extensive experience in a major industrial research lab, while the other author has an equally extensive academic experience. Additionally, they have been collaborating closely for many years on a myriad of applications in these areas. Readers should appreciate that most of the original contributions reported in the book have been filed as patents or patent applications. Some results have also appeared in conference or journal papers, and many have appeared in digital color products as technologies or digital color solutions.

The book is organized into 10 chapters, which can be further grouped into three parts. The first part serves as an introduction to the areas of imaging/printing systems (Chaps. 1 and 2) and dynamic systems and controls (Chaps. 3, 4, and 5). The second part, which forms the core of the book, compiles earlier contributions by the book's authors and colleagues in the application of well-known control techniques to color imaging systems (Chaps. 6, 7, and 8). The third part of the book focuses on modeling and controls of xerographic printing subsystems (Chaps. 9 and 10).

Chapter 1 gives an introduction to digital printing systems. Chapter 2 covers the basics of digital-image processing. Mathematical tools essential for dynamic system analysis, such as Laplace, Z, and Fourier transforms, are described in Chap.

3. Chapter 4 contains the fundamentals for the analysis of linear systems via state-space variables. These tools are used extensively in Chap. 5, which focuses on fundamentals of state feedback control and state estimation theory. The interpolation of multidimensional functions is discussed in Chap. 6, where several techniques developed by the book's authors and colleagues are introduced and illustrated. Chapter 7 covers 3-D color controls, while 2-D and 1-D color controls, together with a spot-color control, are addressed in Chap. 8. Chapter 9 is focused on the modeling and analysis of closed-loop process controls. The final chapter, Chap. 10, describes low-complexity models for all the xerographic printing subsystems, charging, exposure, development, transfer, and fusing. It also covers the problem of how to parameterize a printer model to match experimental results.

The book can benefit students as well as engineers and scientists working in industry. A basic background in college mathematics and some exposure to dynamic systems should be sufficient to understand and apply the concepts described in this book. The book could serve as a great starting point for people working in control systems who are looking for new application areas and for color-imaging experts looking for a new set of tools to apply to their most challenging problems.

The book could also be used as the textbook for an advanced undergraduate or traditional graduate class in imaging systems and control. A good addition to the book would be a website containing support material for a class such as solutions to the problems at the end of the book chapters, slides for the instructor, software for the problems, and new results. The book would also benefit from a complete discussion on future trends for color-imaging systems and associated control tools that could be needed to deal with the future challenges in the field.

Overall, this book is an excellent addition to the literature on the analysis and design of color-imaging systems. It should be recommended to anyone who wants to become familiar with state-of-the-art techniques in these areas.



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