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THEORETICAL FOUNDATIONS of DIGITAL IMAGING Using MATLAB®

Leonid P. Yaroslavsky

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To Dima and Yaro on their 25th and 5th birthdays

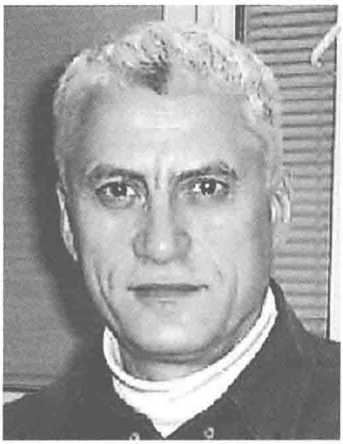
Preface

With the advent and ubiquitous spreading of digital imaging, a new profession has emerged: imaging engineering. This book is intended as a textbook for studying the theoretical foundations of digital imaging to master this profession. It is based on the experience accumulated by the present author for 50 years of working in the field and teaching various courses in digital image processing and digital holography in the Russian Academy of Sciences, the National Institutes of Health (Bethesda, Maryland, USA), the University of Erlangen-Nuremberg (Germany), the Tampere University of Technology (Tampere, Finland), Agilent Labs (Palo Alto, California, USA), the Autonomous University of Barcelona (Spain), the Institute of Henri Poincare (Paris, France), the Kiryu University (Kiryu, Japan), and the University of Tel Aviv (Israel).

The book is addressed to young students who opt to pursue a scientific and research career in imaging science and engineering. The most outstanding minds of mankind, such as Galileo Galilei, René Descartes, Isaac Newton, James Clerk Maxwell, and many other scientists and engineers contributed to this branch of modern science and technology. At least 12 Nobel Prizes have been awarded for contributions directly associated with image science and imaging devices, and a majority of others would not be possible without one or the other imaging methods. You will be in good company, dear reader. Let this book help you to become a master of digital imaging.

A number of MATLAB programs are available at the Download section of this book's web page on the CRC Press website (http://www.crcpress.com/product/isbn/9781439861400).

Author



Leonid P. Yaroslavsky is a fellow of the Optical Society of America, MS (1961, Faculty of Radio Engineering, Kharkov Polytechnic Institute, Kharkov, Ukraine), PhD (1968, Institute for Information Transmission Problems, Moscow, Russia), and Dr. Sc. Habilitatus in Physics Mathematics (1982, State Optical Institute, Saint Petersburg, Russia). From 1965 to 1983, he headed a group for digital image processing and digital holography at the Institute for Information Transmission Problems, Russian Academy of Sciences, which in particular carried out digital processing of images transmitted from the spacecraft Mars-4, Mars-5, Venera-9, and Venera-10 and obtained the first color images of the surface of Mars and the first panoramas of the surface of Venus. From 1983 to 1995, he headed the Laboratory of Digital Optics at the institute. From 1995 to 2008, he was a professor at the Faculty of Engineering, Tel Aviv University, where, at present, he is a professor emeritus. He was also a visiting professor at the University of Erlangen, Germany; National Institutes of Health, Bethesda, Maryland, USA; Institute of Optics, Orsay, France; Institute Henri Poincare, Paris, France; International Center for Signal Processing, Tampere University of Technology, Tampere, Finland; Agilent Laboratories, Palo Alto, California, USA; Gunma University, Kiryu, Japan; and the Autonomous University of Barcelona, Spain. He has supervised 20 PhD candidates and is an author and editor of several books and more than 100 papers on digital image processing and digital holography.

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