Book Review
DIAGNOSTIC RADIOLOGY PHYSICS WITH MATLAB®: A PROBLEM-SOLVING APPROACH, by J. Helmenkamp, R. Bujila and G. Poludniowski

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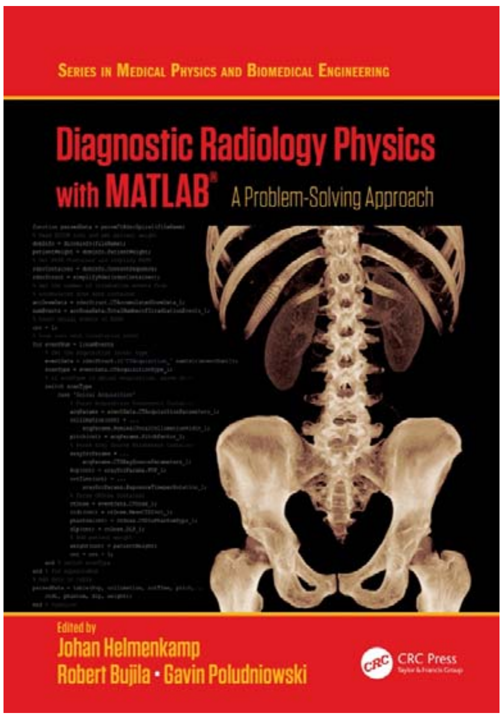

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Computers are essential to the practice of modern diagnostic imaging. Gone are the days when radiological images would be acquired on film and viewed directly using the backlight. Radiologists today are likely to spend most of their day sitting in front of a computer, scrolling through image slices and typing in their findings. The same is true for medical physicists, who rely heavily on computer software for many of the data-heavy tasks they perform as part of their job.

In "Diagnostic Radiology Physics with MATLAB®: A Problem-Solving Approach," Johan Helmenkamp, Robert Bujila and Gavin Poludniowski argue, with merit, that computer programming is an essential skill that every medical physicist should possess. However, medical physics programs still fall short when it comes to teaching trainees how to code. For instance, in northern America, the Commission on Accreditation of Medical Physics Educational Programs (CAMPEP) does not currently include computer programming in its core curriculum. Hence this book, which aims to address this shortcoming by providing the foundational elements of computer programming relevant to diagnostic imaging physics.

As we all know well, computer programming skills are in high demand nowadays, which has led to a proliferation of books and guides all promising to turn us into expert coders. This book is specifically geared toward medical physicists who may wish to learn programming to enhance their professional skills and become more effective on the job.

While the first half of the book offers general principles for programming in MATLAB, the second half takes us deep into the "trenches," with examples of computer programs provided online and explained in detail. More than a dozen authors, some working in medical physics, others employed by the publisher of MATLAB, have come together to contribute their code and expertise in this volume. The book includes relevant problems and examples such as:

- how to compute X-ray cross-sections and X-ray tube spectra using the xrTk toolkit
- how to automate quality assurance tests
- how to estimate absorbed dose during imaging

Reading through the book, one will appreciate topics that are seldom discussed in the programming literature, such as quality assurance of medical software and regulations concerning the use of patient data in software. While a few of the chapters may seem dense and highly technical, many others are written engagingly and filled with colorful language and humor. Some noteworthy chapters are those that discuss the licensing and dissemination of software, good programming practices, and the integration of MATLAB programs with other application programming interfaces.

For all the criticism against it, MATLAB is and will remain one of the most widely used programming languages in engineering and the sciences. It is well suited for exploring data interactively and quickly prototyping a script that automates analysis and plots the results. A few more clicks, and one can add a graphical user interface to make the prototype code easier to use to a wider user base. And, with powerful toolboxes, a short piece of code is often sufficient to deploy complex and powerful algorithms, including specialized functions to interact with DICOM data and analyze images. Although its dominance is being contested by open-source packages such as NumPy and SciPy, MALTAB still runs much of the code used in academic research, thus becoming proficient in its programming is a worthwhile investment.

In sum, while this textbook will probably be most useful to the beginning programmer, I expect it will become a reference text for anyone who routinely uses MATLAB in medical physics practice and research.