Tobin A. Driscoll goes “back to the basics” with MATLAB® handbook

SIAM is proud to be publishing Learning MATLAB, the newest in a strong line of SIAM titles on this widely used programming language. The book introduces MATLAB to new users in an easily understandable and hands-on way. SIAM recently talked to the author, Toby Driscoll, about his academic background, his motivation for writing the book, and what role SIAM has played in his career as a mathematician.

When did you decide to pursue a career in math?

I went to Penn State to get a degree in physics, but I found that the parts of the physics classes I liked best came after the problem had been expressed mathematically—especially the way the same math kept popping up, time after time. I added a math degree, and to get the needed extra credits I ended up doing a fair amount of summer and independent research. Working with an ellipsometer at a materials research lab further convinced me that I preferred models and data to tinkering with an experimental apparatus. Then I did a senior thesis project on numerically solving matrix differential equations arising in linear-quadratic optimal control, and I was hooked on applied math for good.

In fact, looking back, a lot of seeds were planted during that senior experience. I worked some with a software package called MATRIXx, which, in my memory at least, was similar in style to what I would later see in the MATLAB programming language. And rereading the conclusions of my thesis, I see that I was rather negative about spectral methods that I tried for the problem—though now I count spectral numerical analysis of differential equations.

Who were some of your influential teachers?

My most influential high school teacher was my senior English teacher, Mrs. Byrne. She introduced me to the idea of critical reading and demystified the process of writing. From college I have to credit my thesis advisor, John Dzielski, for mentoring me through my first real research project, suggesting that I learn LaTeX, and giving me my first look behind the curtain at a professor’s life. At Cornell I had too many great teachers to name. But certainly Nick Trefethen, who was my PhD advisor, helped to shape the course of my life and career and continues to be a great inspiration and model for me.

None of these people, by the way, was working for a math department. Their greatest contributions lay outside specific bits of knowledge that they imparted to me.

What prompted you to write Learning MATLAB?

My department pays graduate students a stipend to stay for some of the summer after their first year of study. When I arrived, I was asked if I would take a week to teach a MATLAB workshop for these students to help them prepare for research projects. I was expecting the students to know the basics pretty well from required coursework, so I prepared to cover more exotic topics like graphical interfaces and object-oriented programming. Knowing I needed a rather customized selection of topics, and being very experienced with MATLAB, I started writing up my own notes for them to keep.

As it turned out, not all of the students were not ready for the advanced subject. I decided to go back to the basics. I wanted to convey two overarching themes from my own experience: trying to do things well in MATLAB leads to a much deeper understanding of linear algebra; and the best way to handle complex, layered problems is to break tasks down to the level of functions. And I still had just a week! Gradually, I moved over to a more problem-based model, having students work in a computer lab, and this led to a need for exercises, which I added and tweaked.

Friends and colleagues know that I’m a MATLAB booster, so I often get asked if I can recommend a book on it. Now, there are a lot of introductory MATLAB books out there. Many of them are well written and packed with great information, and I have no trouble recommending them. But these books also tend to be thick and fairly expensive. I love using MATLAB and getting into all the gritty details, but I started to wonder whether for a lot of people a leaner, more selective handbook would be helpful. For some time I had been getting requests from colleagues and strangers for permission to use my notes, so I decided to take the plunge.

How have you benefited from your association with SIAM?

SIAM provides so many things. There’s the aspect of learning from and collaborating with like-minded people at conferences. SIAM does a nice job helping students and young professionals; my students have benefited from travel awards, as I did once too, and we have a great student code office. And SIAM is proud to be publishing this book, which I hope will be a useful resource for almost any type of user.

Tobin A. Driscoll is an Associate Professor in the Department of Mathematical Sciences at the University of Delaware whose research focuses on the numerical analysis of differential equations.

Learning MATLAB

Tobin A. Driscoll

This engaging book is a very compact introduction to the essentials of the MATLAB programming language and is ideal for readers seeking a focused and brief approach to the software. Learning MATLAB contains numerous examples and exercises involving the software’s most useful and sophisticated features along with an overview of the most common scientific computing tasks for which it can be used.

Rather than including exhaustive technical material, the author teaches through readily understandable examples and numerous exercises that range from straightforward to very challenging. Readers are encouraged to learn by doing—creating the examples themselves, reading the online help, and trying the exercises.

This handbook is suitable for graduate students, advanced undergraduate students, and professional researchers in mathematics, scientific computing, and application areas in science and engineering. It can be used as the primary text for a short course, as a companion textbook for a numerical computing course, or for self-study.

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May 2009

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