Scilab Textbook Companions

The purpose of this column is to announce the availability of computer programs as a companion for the examples in many of the textbooks used in courses for teaching control engineers [1]. The computer programs are written in Scilab, which is free open-source software for numerical computations originally developed at Inria [2] and currently managed by Scilab Enterprises [3]. Scilab is an alternative high-level programming language to Matlab, with similar functionalities such as linear algebra, two- and three-dimensional visualization, optimization, statistics, signal processing, dynamic simulation, and control systems analysis and design.

Each set of computer programs is known as a *textbook companion*, which more generally is a repository of materials to support the training of students using a particular textbook. The concept of a textbook companion is not new and includes study guides, videotaped lectures, and worked-out solutions to homework problems. A compelling feature of the Scilab textbook companions [1], whose development is led by Prof. Kannan M. Moudgalya at the Indian Institute of Technology Bombay, is their impressive scope. So far, the Web site [1] contains the Scilab programs for all of the examples in more than 280 textbooks in science and engineering and is expected to contain another 300 textbooks in the near future [4].

Topical areas covered by the textbooks include control systems, signal processing, digital communications, analog and digital electronics, physics, mathematics, computer programming, and mechanical and chemical engineering. Many of the textbooks are widely used to train control engineers, including

» *Automatic Control Systems* by Benjamin C. Kuo and Farid Golnaraghi
» *Modern Control Engineering* by Katsuhiko Ogata
» *Process Dynamics and Controls* by Dale E. Seborg, Thomas F. Edgar, Duncan A. Mellichamp, and Francis J. Doyle III
» *Linear Systems and Signals* by B.P. Lathi

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» *Digital Signal Processing: Principles, Algorithms, and Applications* by John G. Proakis and Dimitris K. Manolakis
» *Nonlinear Dynamics and Chaos* by Steven H. Strogatz
» *Linear Algebra and Its Applications* by Gilbert Strang.

The developers of the Scilab textbook companions have also set up a Web site [5] so that anyone can run the computer programs without having to install Scilab on their local computers.

Searching among the textbook companions is a useful facility [6]. For example, a search on the term "ss2tf" lists 31 examples in which that Scilab command is used. The textbook companion effort is being replicated in several other open-source software systems [7]. This project to generate and disseminate teaching materials based on free open-source software is funded by the National Mission on Education through Information and Communication Technology launched by the Union Ministry of Human Resource Development of the Government of India [8].

REFERENCES

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