Chapter 2
Control System Design and Analysis Education via the Web

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2.1 Introduction

Advances in mathematics and computing technology have greatly expanded the range of control systems and engineering problems that can be solved [1]. As methodologies become more computational intensive, the desire for development of innovative teaching and learning software has increased. To meet the demand, software packages such as the MATLAB Control Systems Toolbox [2] and Mathematica's Control System Professional [3] have been developed and made commercially available for the purpose of computer aided control system design and analysis.

Web based computing has proven to be an efficient and reliable method of performing complex tasks in recent times. Web based applications allow users to use applications that may not reside on their own computers. These tools also serve as a promising technology that could greatly improve the teaching and student learning of control systems by allowing students to quickly and easily try out different control systems from a simple web interface without needing to install or run special software [4, 5]. Web based computing in the field of automatic control systems and education have also undergone rapid development in recent years. Many virtual and remote laboratories have been developed on a variety of back-ends and web interfaces, utilizing technologies such as Java applets, databases, and webcams to record physical experimentation apparatuses [6-8].

An embeddable C/C++ interpreter known as Ch has been developed by Cheng [9]. The Ch language is a superset of C and fully supports all C99 constructs, including complex numbers, variable length arrays, and IEEE floating-point arithmetic and type-generic mathematical functions. Ch also supports C++ classes for object-oriented programming. In addition, Ch has built-in 2D and 3D plotting capabilities, as well as support for computational arrays for matrix computation and linear system analysis.

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