A Review of Programmable Logic Controllers in Control Systems Education

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Abstract
A Programmable Logic Controller (PLC) is a standard industrial control device that provides a simple, yet robust, method of controlling manufacturing and dynamic processes. As a result of their low cost, adaptability, and reliability, PLCs are by far the most common control mechanism used by manufacturing businesses of all sizes for environment control, food processing, motion control, and automated test equipment. Yet even though PLCs are heavily used by industry, their use in teaching control theory concepts is uncommon for mechanical engineering programs. Traditional control systems engineering courses focus on the theory and mathematics of continuous-based control systems and rarely involve the use of PLCs, which provide an excellent platform to teach feedback control. Only a few programs have included a specific focus on non-continuous (on/off) control commonly used in industrial environments. In addition, learning ladder logic, a programming language for PLCs, can be difficult and seem unnecessary for those with a traditional programming background, such as C++. Recognizing the appropriate ways of how and when to use PLCs is a key factor in applying control theory effectively in an industrial or even a research environment.

This paper reviews the literature devoted to control systems education. It shows how academia is using PLCs in education and how it can complement the traditional focus on continuous-based control. A key objective of this paper is to review the PLC use in mechanical engineering education, which traditionally takes place in a control systems engineering course. This paper will also address a proposal by the authors that implementing PLCs into a control systems course for mechanical engineering students can enable a natural integration of continuous and non-continuous control theory.

Comments
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maintenance cost of PLC is low. Documentation: The programmer can program and print easily the programs of PLC for future use. Ranjeet R Patil. In this paper a review on the application of programmable logic controller (PLC) in our current market is discussed. Investigations on the applications of PLCs in energy research, engineering studies, industrial control applications and monitoring of plants are reviewed in this paper. PLCs do have its own limitations, but findings indicate that PLCs have more advantages than limitations. This paper concludes that PLCs can be used for any applications whether it is of simple or complicated control system. As the need of automation increases significantly, a control system needs to be easily programmable, flexible, reliable, robust and cost effective. In this paper a review on the application of programmable logic controller (PLC) in our current market is discussed. A mechatronics educational laboratory – Programmable logic controllers and material handling experiments Hany Bassily a, Rajat Sekhon a, David E. Butts b, b,1,1, John Wagner. Three focused progressive experiments are reviewed that allow students to program and operate a programmable logic controller, a traditional conveyor system, and a distributed servo-motor based conveyor. The students also program and implement two robotic arms for material handling applications. The equipment, learning objectives, and experimental methodology for each laboratory are discussed to offer insight.