

Virtual Laboratories for Control System Design

Virtual Laboratories for Control System Design (VL-CSD) is a unique software-learning tool, which provides an on-line solution to the traditional “physical” experimental laboratories undertaken for control system design concepts.

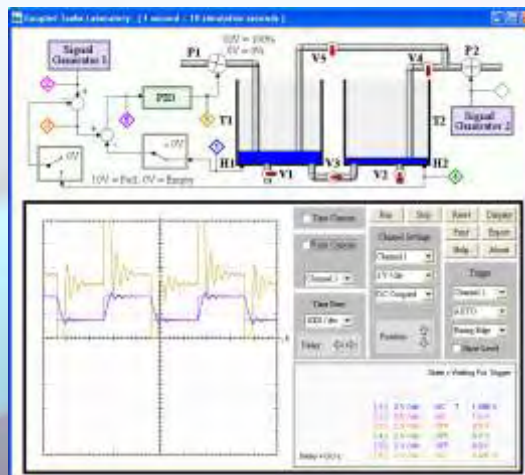
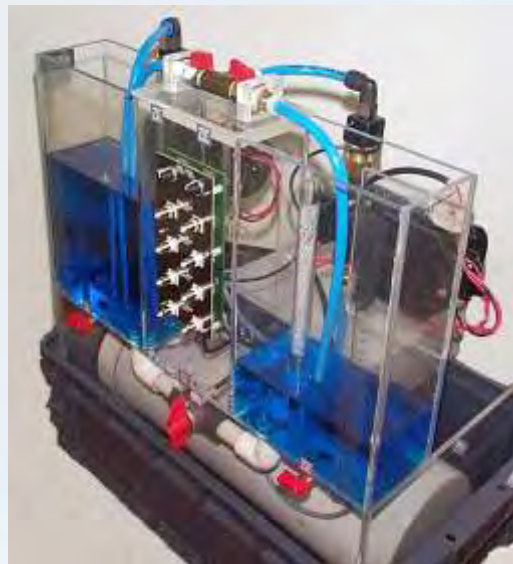
The VL-CSD virtual software model allows the student to self-pace these Laboratories by applying the systems and control theory learnt in their studies to this simulated environment.

This software tool has been developed based on real world control situations and gives the student an exposure to real world events that are difficult to replicate in the traditional physical laboratory.

VL-CSD provides an unparalleled opportunity to learn about control system design. The Laboratories can be used by undergraduate students within universities as well as by practicing engineers keen to continue their education.

The VL-CSD concept presents a new approach to systems and control education. VL-CSD provides industrial scale experiments and challenging case studies based on real world designs, which could be difficult, and in some cases impossible, to accommodate with traditional educational resources.

VL-CSD has been developed by *Professor Graham Goodwin* and his team at the University of Newcastle, Australia. Professor Goodwin is a world leader in the theory and applications of systems control.



Benefits

- Self-paced learning tool
- Autonomous and does not depend on other software products
- Simple to access and use
- Cost effective with no up front equipment costs (as would exist with traditional physical laboratory experiments)
- Based on real-time animations to emulate the operation and connectivity of the physical device
- Captures real world designs that have been fully tested and implemented in practice
- Tied to specific learning objectives
- Built on the extensive design experience and knowledge of the developers



Virtual Laboratories for Control System Design

Available Packages

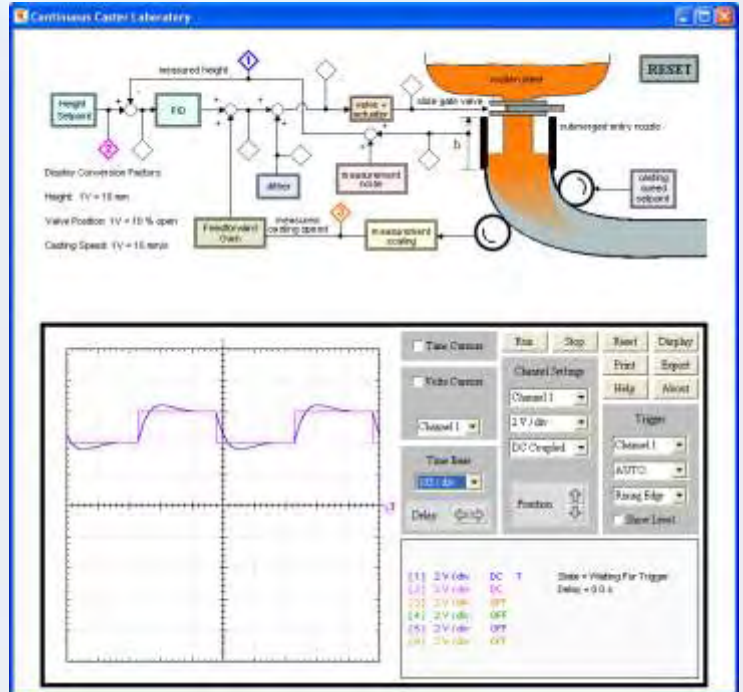
A total of 7 packages grouped into **Industrial** and **Benchtop** series is currently available as part of the VL-CSD product.

The **Virtual Industrial Laboratory** series of four packages have industrial scale experiments and challenging case studies based on real world designs:

1. Continuous Caster Package
2. Rolling Mill Package
3. Rockets Package
4. Paper Machine Package

The **Virtual Benchtop Laboratory** series of three packages are designed to be challenging to the student with learning objectives related to teaching control concepts. These have a focus on benchtop style apparatuses and can also augment physical laboratories of a similar type:

5. Audio Signal Processing Package
6. Electromechanical Servomechanism Package
7. Fluid Dynamics and Control Package



Learning Benefits

These Laboratories are not intended to totally replace hardware based experiments. However, we see substantial additional value in supplementing traditional hardware experiments with virtual laboratory work which can go well beyond the limits normally associated with laboratory style hardware.

In addition to the structured learning provided by the Laboratory, the simulations can also motivate students to further explore the underlying concepts through a process of self-directed exploration.

Each laboratory module includes tools which allow quantitative observations i.e. a signal generator, oscilloscope and a (real-time) controller.

