

Pearson BTEC Level 4 Higher Nationals in Engineering (RQF)

Unit 6: Mechatronics

Unit Workbook 3

in a series of 4 for this unit

Learning Outcome 3

Simulation and Modelling Software

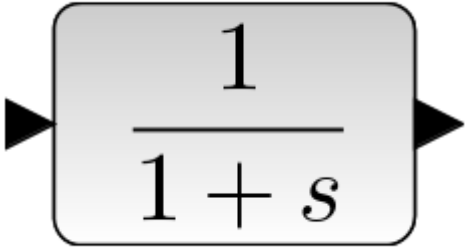
Contents

SCILAB SIMULATOR	3
Xcos	3
System Elements	4

SAMPLE

The assignment for this learning outcome asks you to build and simulate a control system using Xcos. Guidance on how to build such a system is [provided in this video](#).

System Elements

	CLR Continuous Transfer Function You will learn about system transfer functions if you go on to study the level 5 Unit 54: Further Control Systems Engineering. For now, just think of a transfer function as way of describing a circuit or system – for example, a low-pass filter.
	PID controller Proportional-Integral-Differential controller If we are trying to set a temperature for a central heating system, we will always have an error (difference) between the Set and Measured temperature values. The PID controller is used The PID controller is manipulated via three constants; ▪ K_p the proportional constant, which determines the reaction to the current error ▪ K_i the integral constant, which determines the reaction based upon the sum of recent errors ▪ K_d the differential constant, which determines the reaction based upon the rate at which the error has recently been changing

We may think of a predicted value as the end-point of a step function. Perhaps the step function settles on 22 degrees centigrade, for example.

From this point forward, you are pretty much on your own in terms of playing about with the Xcos simulator. For the purposes of the assignment though, play close attention to the video hyperlinked on page 4.

If you go on to study Unit 54: Further Control Systems Engineering you will learn a lot more about transfer functions, Laplace Transforms and PID control.

SAMPLE