

WEEK 4 MODELLING**Week 4 Report**

Submission of final report and brief oral presentation (5 min limit).

Objectives

To learn how to program and produce graphs in Excel. To observe the dynamic response of the approximate linear FOPDT model for a system. To observe the impact of parameter values on the dynamic response.

FOR NEXT WEEK

Bring with you the results of the steady state and step response experiments. Specifically, you must have

Gain

t_0

at your chosen operating point (both for step up and step down) and the values of the steady-state input and output parameters at the operating point.

For the level-control system and position-control system, you must have the parameters necessary for the approximate linear FOPDT model of your system.

Post these results also on the bulletin board in your area in the laboratory.

WEEK 5 MODELLING -- APPROXIMATE LINEAR FOPDT MODEL**Objectives**

To learn how to model first-order-plus-dead-time (FOPDT) with Excel. To observe the dynamic response of the approximate linear FOPDT model for a system. To observe the impact of parameter values on the dynamic response. To adjust the linear FOPDT model parameters to get the model results to agree with the experimental results.

Modelling AssignmentsApproximate FOPDT Method

Reference: Smith & Corripio, pp 216-220

Disk File Suggestion: For all your model & results files that you save this week, start their names with "W5" (meaning week #5).

Week 6 Report

A draft of Week 6 Report is due the second school day before the next scheduled lab meeting.

WEEK 6 REPORT CONTENTS
STEP RESPONSE MODELLING

Introduction**Theory & Background**

Description & explanation of system components & connections.

Schematic diagram (like S&C, Fig. 5-1). Input function(s) and output function

Theory & governing equations for components and system (like S&C, equations 3-1 & 3-2)

Laplace domain descriptions in terms of deviation variables, OLTF (like S&C, equations 3-7 & 3-10)

Approximate FOPDT model (like S&C, example 6-9)

Block diagram (like S&C, Figure 3-19)

Modelling

Equations

Procedure**Results**

Steady state performance curves (SSOC's). Experimental results for step input (curves, gain, time constant & dead time for different conditions) (like S&C, Figure 6-17).

Modelling results for step input (curves)

Direct comparison of experimental and modelling results.

Description of errors in results and estimates of magnitudes of error

Discussion

Comparison with theory, modelling & experiments

Conclusions**Recommendation****Appendices**

Physical properties (dimensions, etc.) of components & system

Modelling diagram, equations

Attachments

Include a sheet for each team member that describes the contribution to the work in the laboratory since last reported.

Disk File Suggestion: Use file names beginning with "WR6"