2.2 DATA-BASED INFERENTIAL QUALITY CONTROL IN BATCH REACTORS

2.2.1 INTRODUCTION

Background

- Large quality variances are often due to
  - machine (equipment, instrumentation) errors for which the dinstinction betwewn failures and nonfailures are clear
  - feed variations and operating condition variations for which the dividing line between failures and nonfaillures is often blurred.
- The latter disturbances tend to fluctuate quite a bit from batch to batch and are usually not removable at source.
- For these disturbances, on-line prediction and control are desired rather than statistical monitoring followed by diagnosis (since these cannot be categorized as as Pareto's glitches).

Key Idea

- Capture the statistical correlation between easily measured process variable trajectories and final quality variables through regression.
- Use the regression model for on-line prediction and control (through manipulation of operating parameters) of final quality variables.

Application

- Batch Pulp Digester
- Nylon 6,6 Autoclave

2.2.2 CASE STUDY IN DETAILS

See the attached!

2.3 INFERENTIAL QUALITY CONTROL OF CONTINUOUS PULP DIGESTER

2.3.1 INTRODUCTION

Background

- In continous systems, on-line quality measurements are often (1) very difficult, (2) very expensive, and/or (3) unavailable.
- Lab measurements introduce large delays, making tight control impossible (high-frequency errors are pretty much left uncontrolled).
- There is significant incentive to reduce the variability by increasing the bandwidth of control.

Key Idea

- Relate more easily measured process variables to quality variables *dynamically* through data regression.
- Use the regression model for on-line prediction and control of quality variables.
  Elimination of delays $\rightarrow$ More efficient prediction of quality variables $\rightarrow$ tighter control.

Appication

- A continuous pulp digester.

2.3.2 CASE STUDY IN DETAILS

See attached!