Analog controllers

Advantages:

➤Simple and inexpensive control

Disadvantages:

➤Less accuracy

➤Adjustment of control-complicated (Ex:PID)

➤Reconfiguration require for changing a controller

➤Computation and dead-time compensation are difficult and imprecise

➤More time

Digital control schemes

Advantages

➢ Overcome the disadvantages of analog control

➢ Record keeping and statistical process control are easy

- Supervisory control
- Direct digital control
- Distributed computer control

Supervisory control
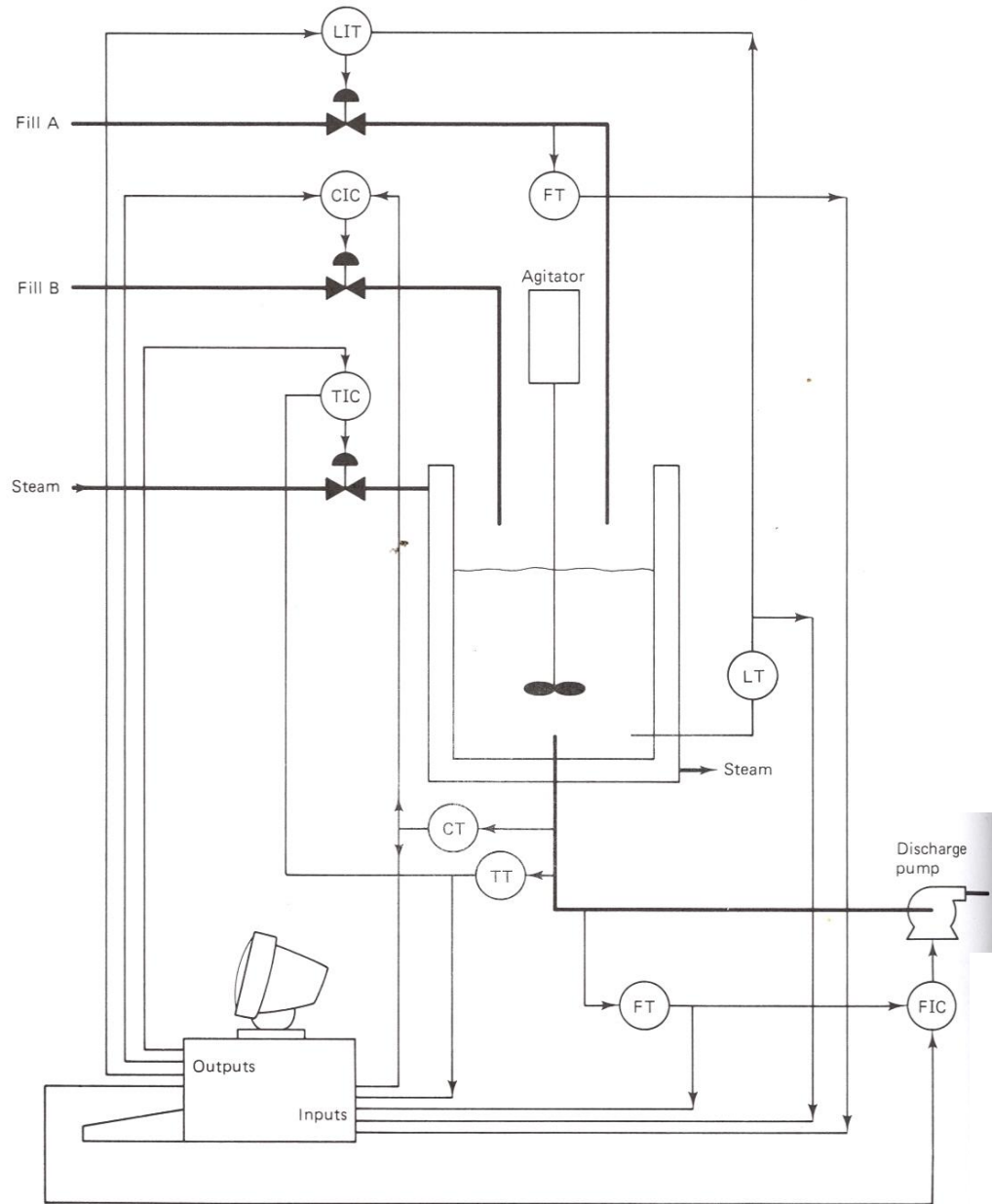
- Analog control also be presented in loop
- Process variable accessed by computer to track the analog controller set point
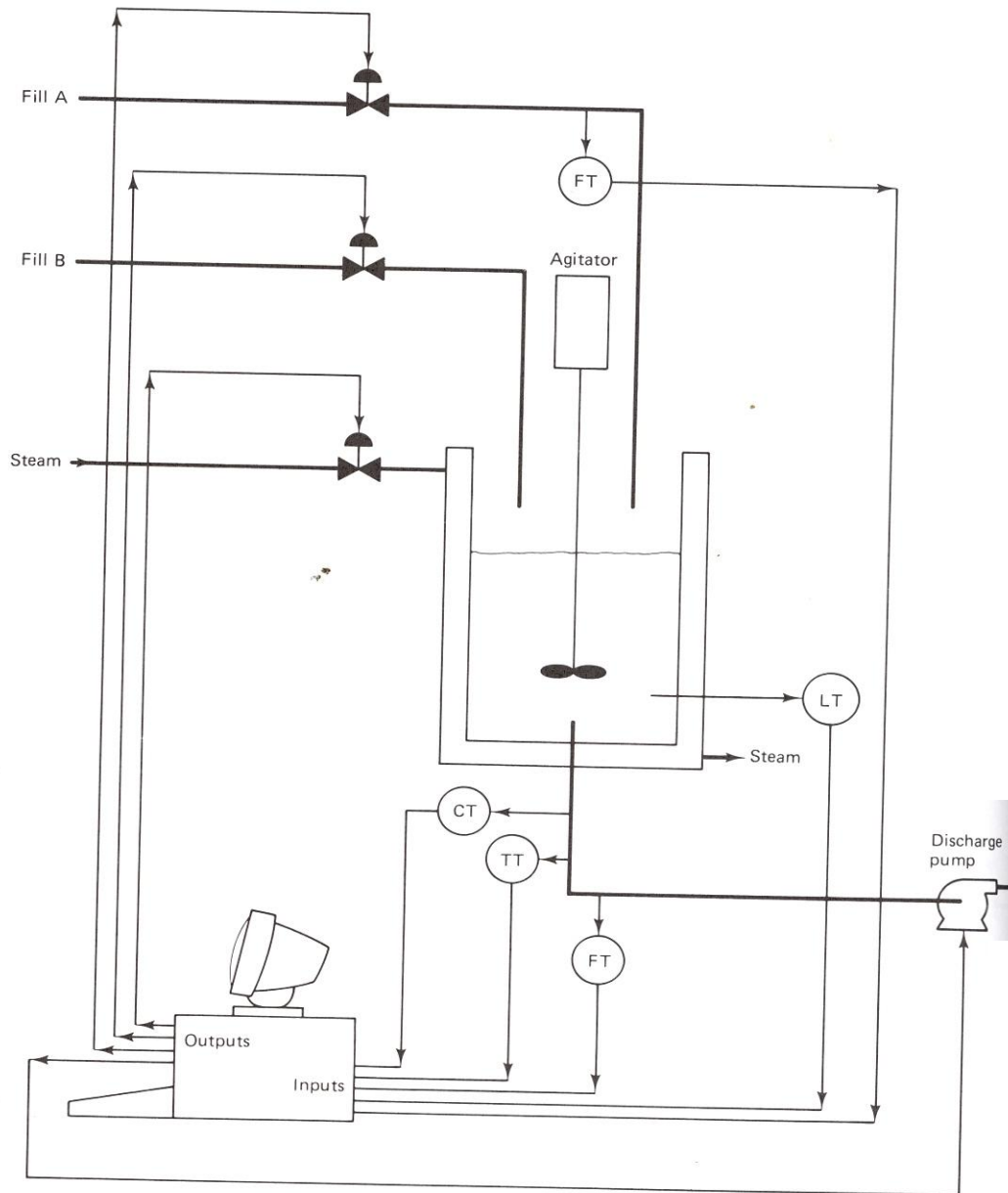- Final control by analog controller

Advantages

- Easy to install in existing facility
- Control can be return to analog controller-if computer fails

Disadvantages

- Self tuning, dead time compensation..etc are denied

Direct Digital control

- Analog control has been removed
- Process variable accessed by computer through sensor
- Setting of actuator by control algorithm
- Final control by computer
- 100 loops may be under direct control
- Another computer has been used for monitoring the main control computer
  - Expensive & require sophisticated software
- Self tuning, dead time compensation..etc are possible

Distributed computer control
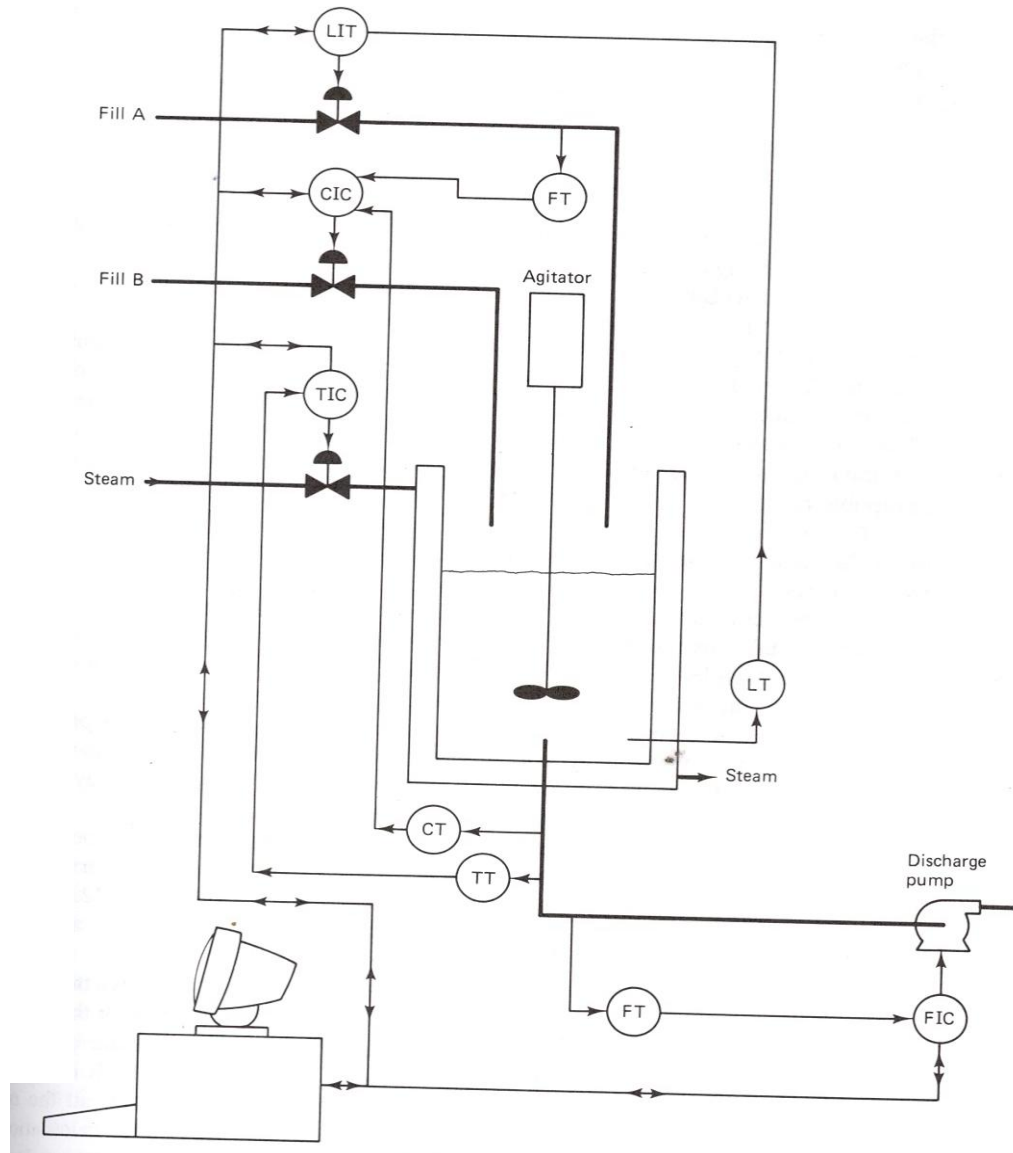
- Analog control has been removed
- Microprocessor and single-ship computer has been used
- Each control loop has individual computer
- Each control loop computers are connected with cell supervisor for programming and commands
- Communicate a cell supervisor through serial data link (RS-232 or RS422)
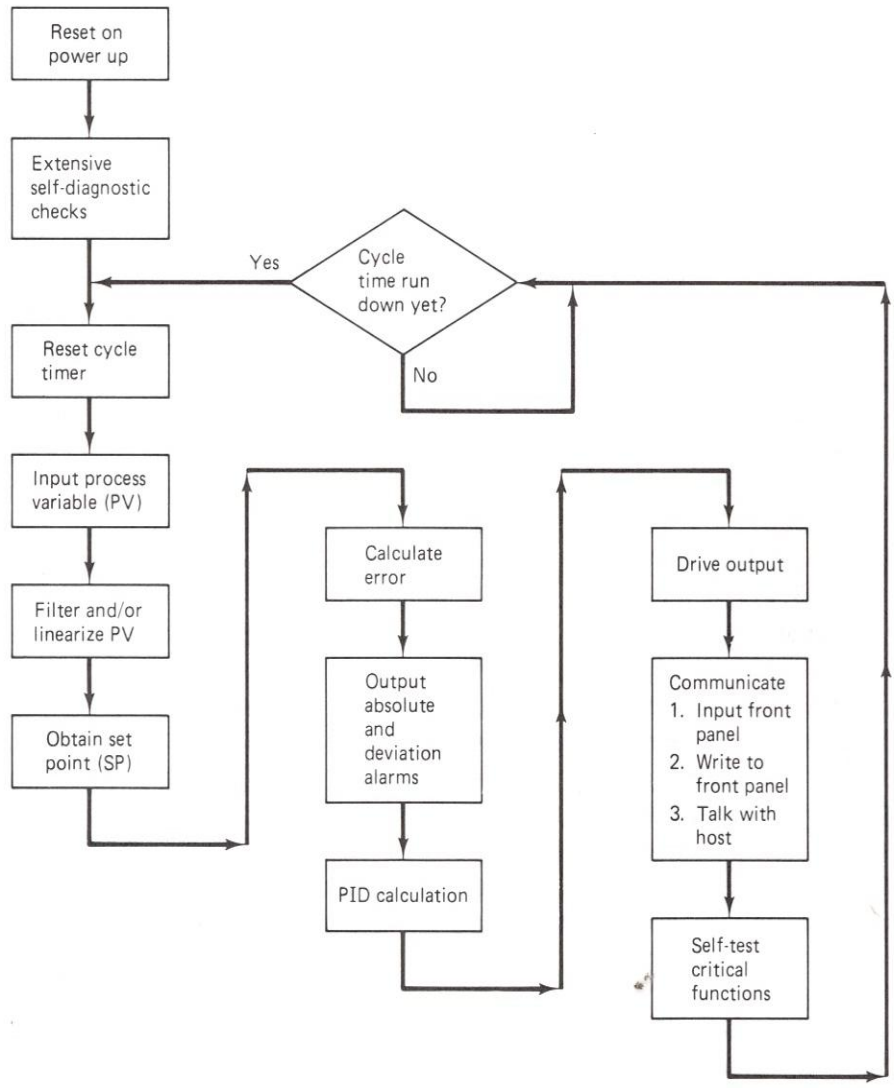- LAN or MAP can be used for sharing

Advantages

- Long term stability, self tuning, complex algorithms and dead time delay is possible
- Lower cost

Single-loop microcomputer-based controller
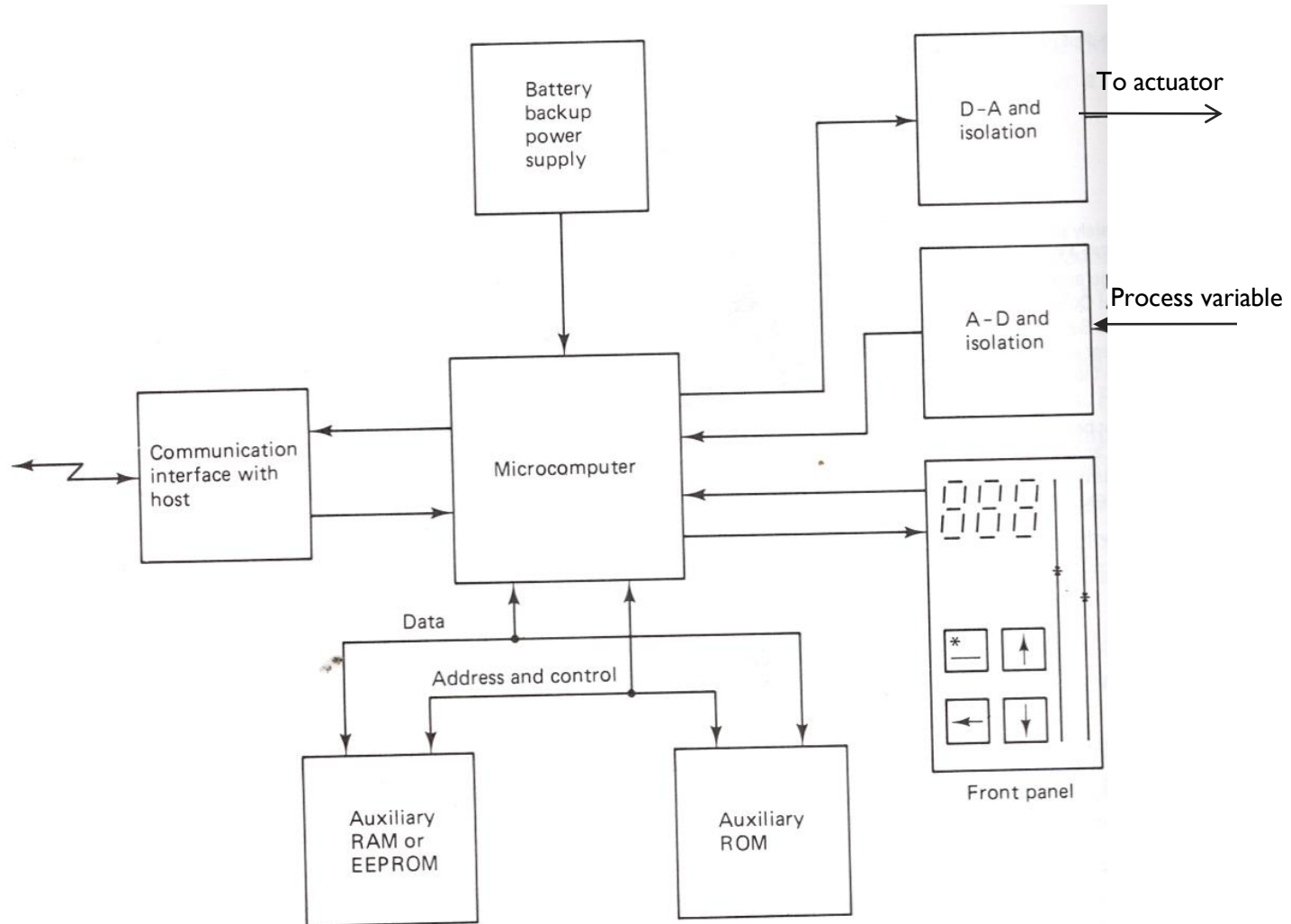
Single-loop controller software flowchart

Control Algorithms

Aontrollers