Bab 11. Level Transmitter and Filtering

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Level Measurement

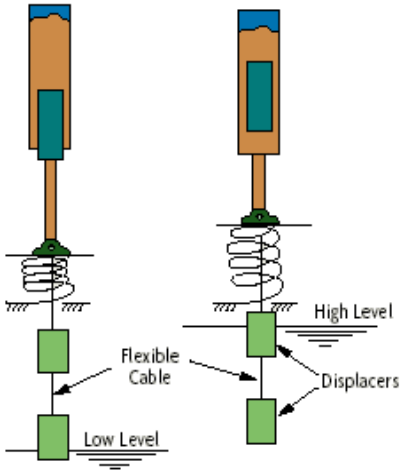


Fig. Displacement

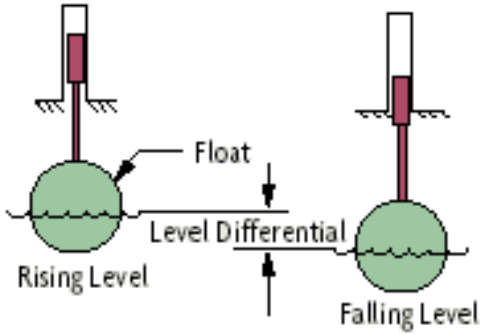


Fig. Float

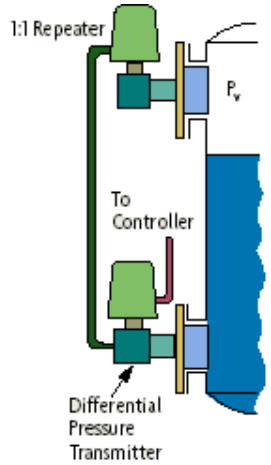


Fig. Differential Pressure

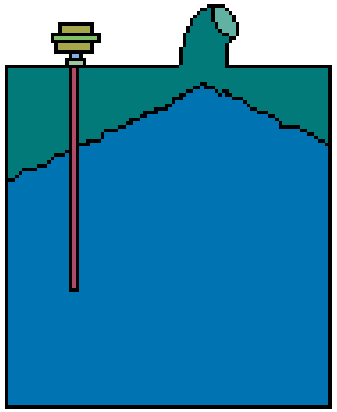
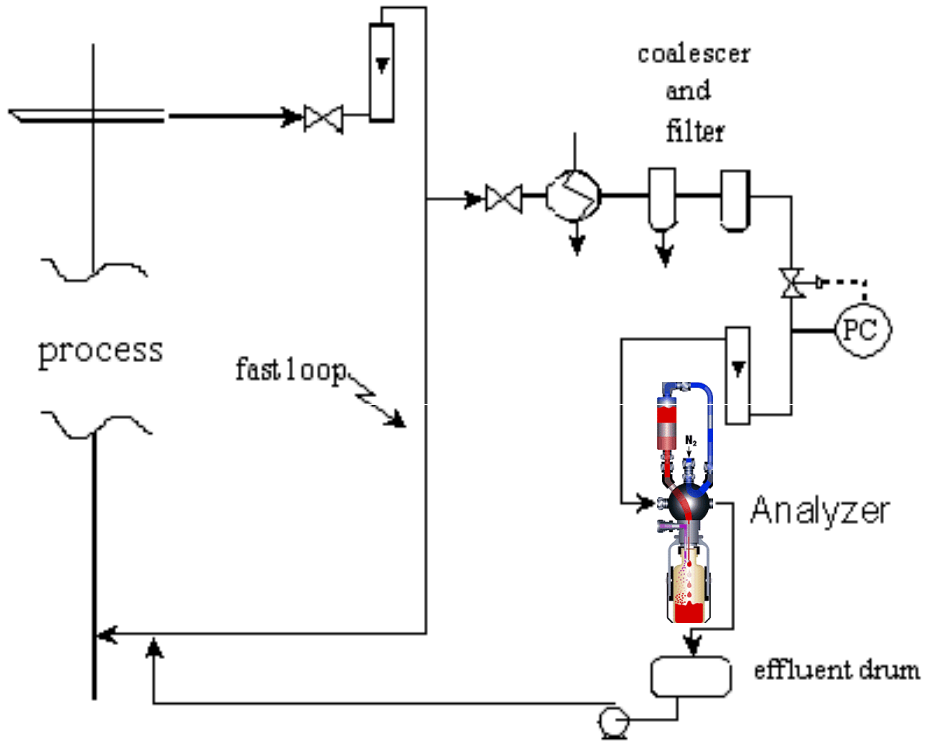


Fig. Capacitance

Analyzer

- Any sensor that measures a physical property of the process material, such as purity (e.g., mole % of various components), a basic physical property (e.g., density or viscosity), or an indication of product quality demanded by the customers in the final use of the material (e.g., gasoline octane or fuel heating value)



The Control Relevant Aspects of Sensors

- Accuracy
- Good reproducibility
- Fast dynamic response
- Reliable

Filtering (1)

- Noise source
  - Process nature (turbulence, vibration, oscillation)
  - Various noise source from environment
  - Power line, electromagnetic force
- Removing noise
  - Analog filter
    - First order filter

$$\tau_f \frac{dy_f}{dt} + y_f = y$$

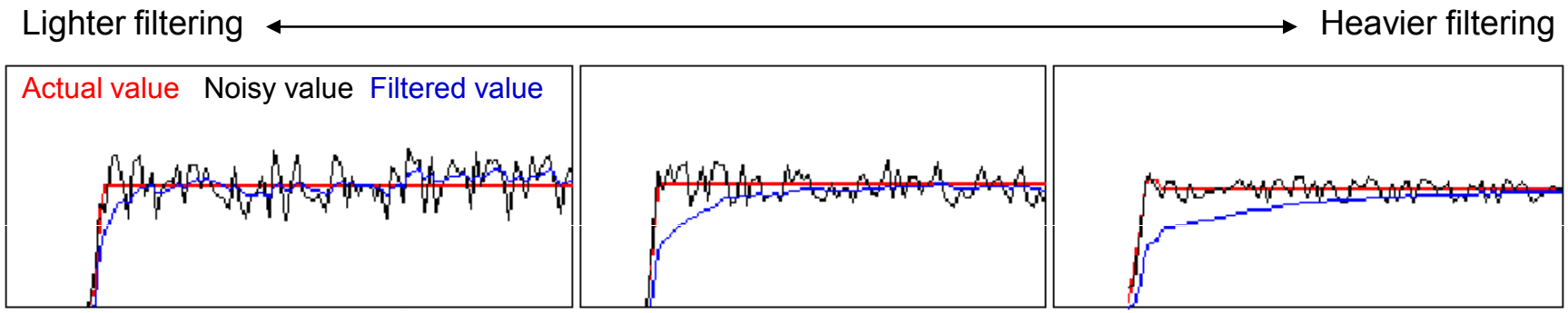
τ_f: Filter time constant

y_f: Filtered output

y: Measured output

Filtering (2)

- As τ_f increases, heavier filter is applied



Session Summary

- Sensor/transmitter is used to obtain the information from process
- Each sensor/transmitter has static and dynamic properties to be evaluated in order to obtain the good informations for control purpose