



Introduction to Control Systems - Part 2

Notes

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$u(t) \rightarrow [S(\cdot)] \rightarrow y(t)$
 $y(t) = S(u(t))$

Amount of cold air \rightarrow ROOM AC \rightarrow Temperature

Problem 1). Given $u(t)$ & $y(t)$, find $S(\cdot)$. \rightarrow SYNTHESIS.

Problem 2). Given $S(\cdot)$ & $u(t)$, find $y(t)$. \rightarrow ANALYSIS/PREDICTION.

Problem 3). Given $S(\cdot)$ & $y(t)$, find $u(t)$. \rightarrow CONTROL.

Examples:

- \rightarrow Room temperature control.
- \rightarrow Motor speed control.
- \rightarrow Human body.

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\rightarrow Motor speed control.

\rightarrow Human body.

Control

- Open Loop Control, eg: Ceiling fan.
 - No feedback.
 - Cannot tolerate disturbances.
 - Lower cost and complexity.
- Closed Loop Control
 - Feedback \rightarrow process of measuring variables that need to be regulated so that corrective action can be taken.
 - Robust to uncertainties, disturbances.
 - Higher cost and complexity.

Reference Input $W(s)$

Error $e(t)$

Controller

Control Input $V(t)$

DC Motor System/Plant

Output $Y(t)$

Closed Loop Control System with Negative Feedback.

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