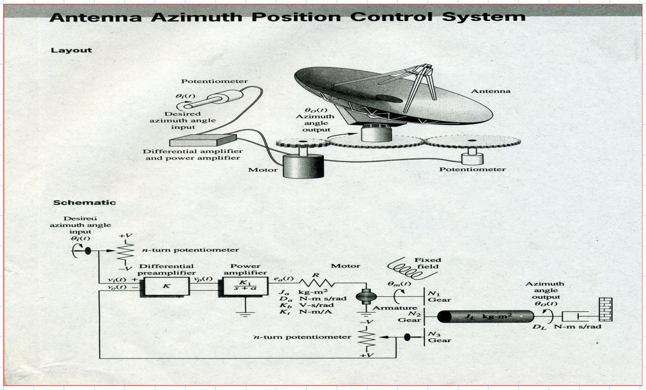
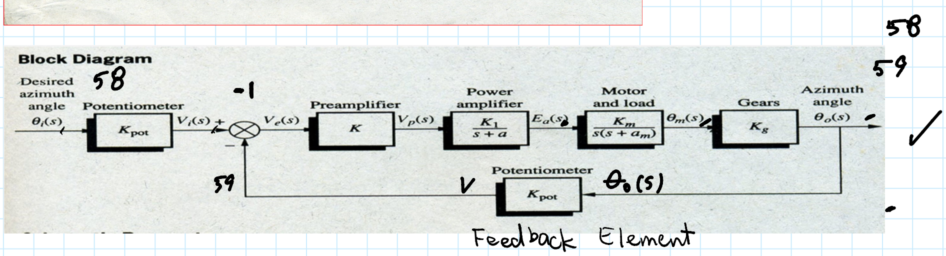
Block Diagram

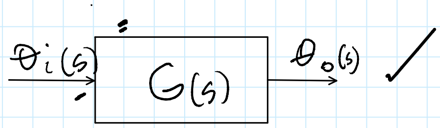
Thursday, 18 April 2024 8:12 am

Design of Feedback Control System

- Step 1. Transform requirements into a physical system
- Step 2. Draw a functional block diagram
- Step 3. Create a schematic
- Step 4. Develop a mathematical model
- $\boxed{\text{Step 5. Reduce the block diagram}}$
- Step 6. Analyze and design





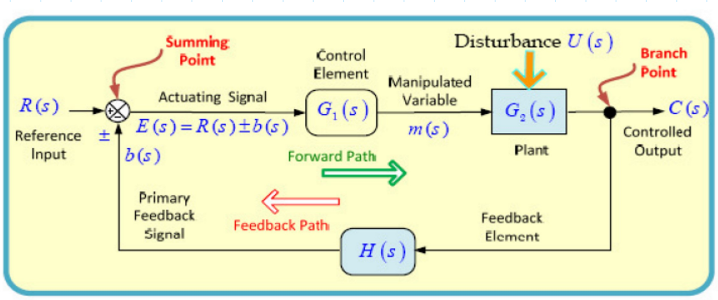


Block Diagram
- Defined as a pictorial representation of functions performed by each component of a system and that of flow of signals. Each block is characterized by an input–output description.

Block Diagram Reduction
- In order to evaluate system response, we need to reduce the large system's block diagram to a single block with a mathematical description that represents the system from its input to its output. Once the block diagram is reduced, we are ready to analyze and design the system.

Block Diagram Algebra
- the **algebra** involved with the basic elements of the **block diagram**.

From <https://www.google.com/search?q=block+diagram+algebra&oq=block+diagram+algebra&aqs=chrome..69i57j0l7.7680j0j7&sourceid=chrome&ie=UTF-8>



Block Diagram Elements

$$G(s) = \frac{C(s)}{R(s)}$$

$$C(s) = R(s)\,G(s)$$

$$R(s) = \frac{C(s)}{G(s)}$$

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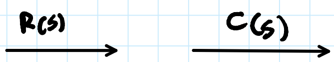
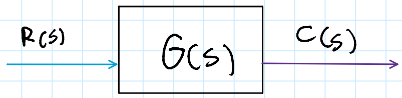
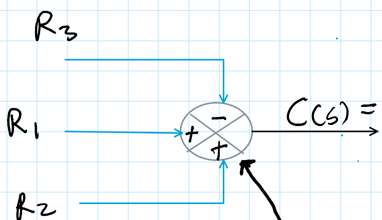


signal arrows



Block / System / Plant

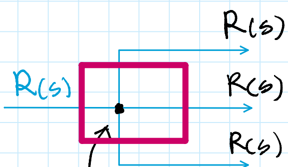


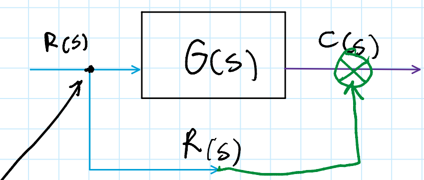
$C(s) = R_1 + R_2 - R_3$

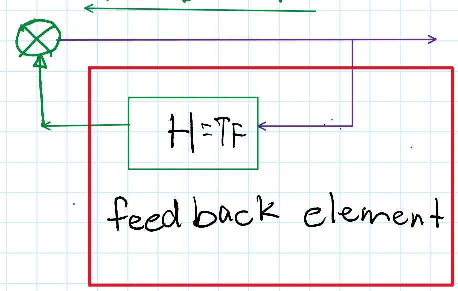
Summing point
diff "
error point

Forward Path

Feed back path







Branch point / Pick-up point / Take-off point