SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

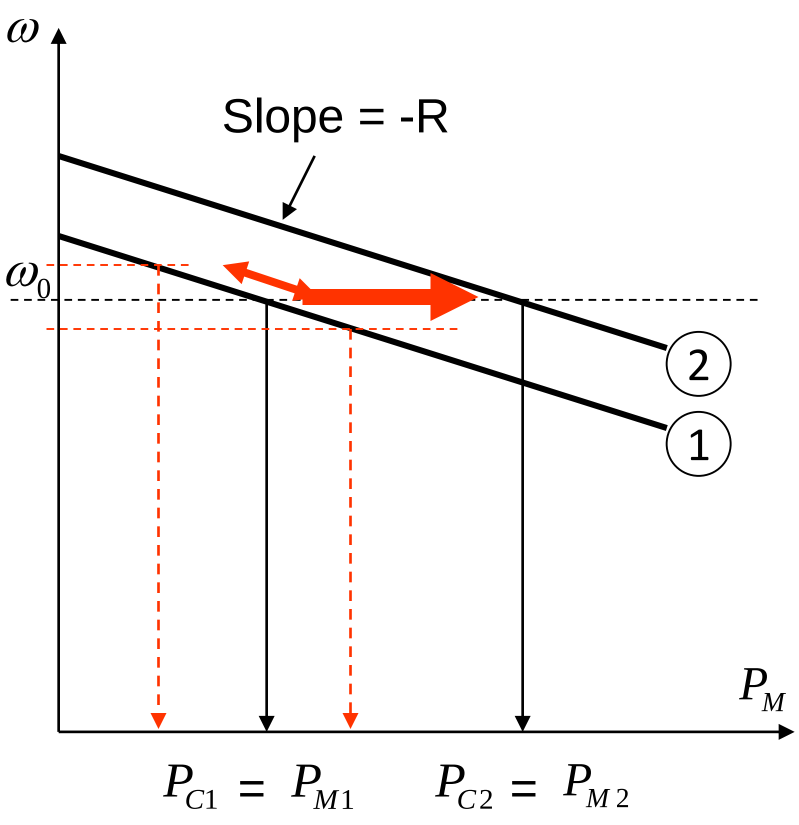
Accredited by NBA-AICTE and Accredited by NAAC – UGC with A+ Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

UNIT 3

LFC control of Single area and Multi area system

STATIC SPEED-POWER CURVE



- From,

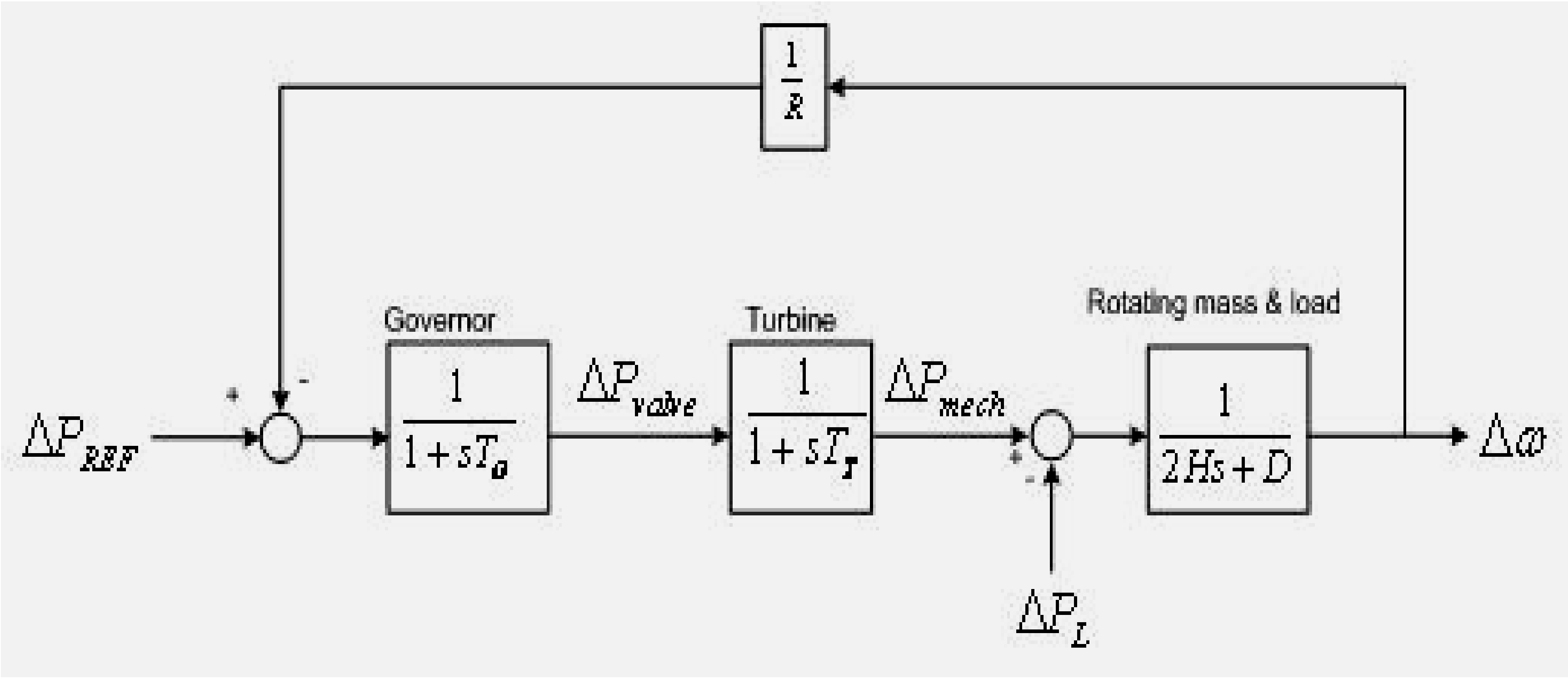
$$\Delta P_M = \Delta P_C - \frac{1}{R}\Delta\omega$$

- Primary control: Immediate change corresponding to sudden change of load (frequency)
- Secondary control: Change in setting control power to maintain operating frequency.
- The higher R (regulation), the better.

AGC FOR SINGLE AREA

- System Modeling
- Single Generator
- Multi Generators, special case: two generators

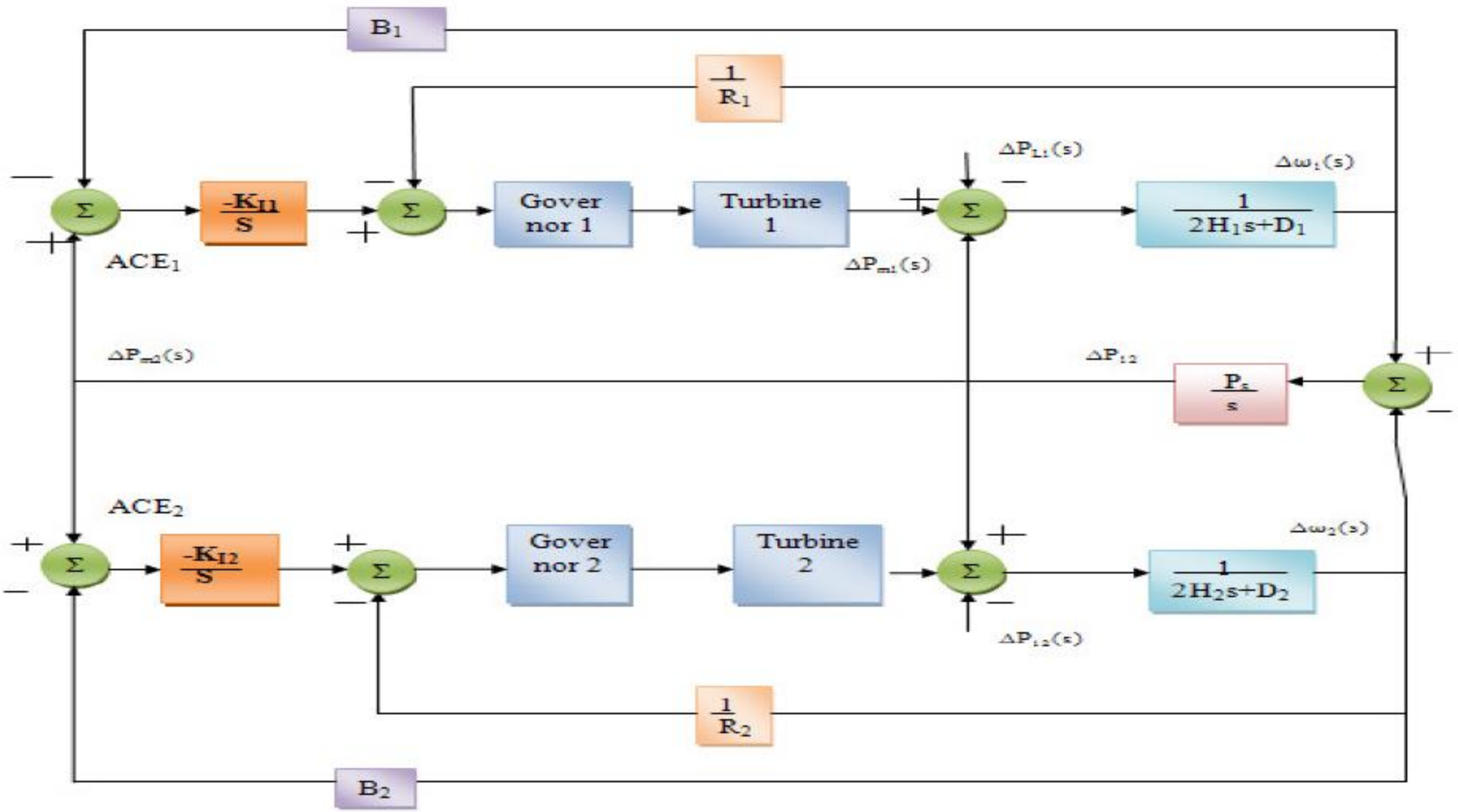
LFC FOR SINGLE AREA



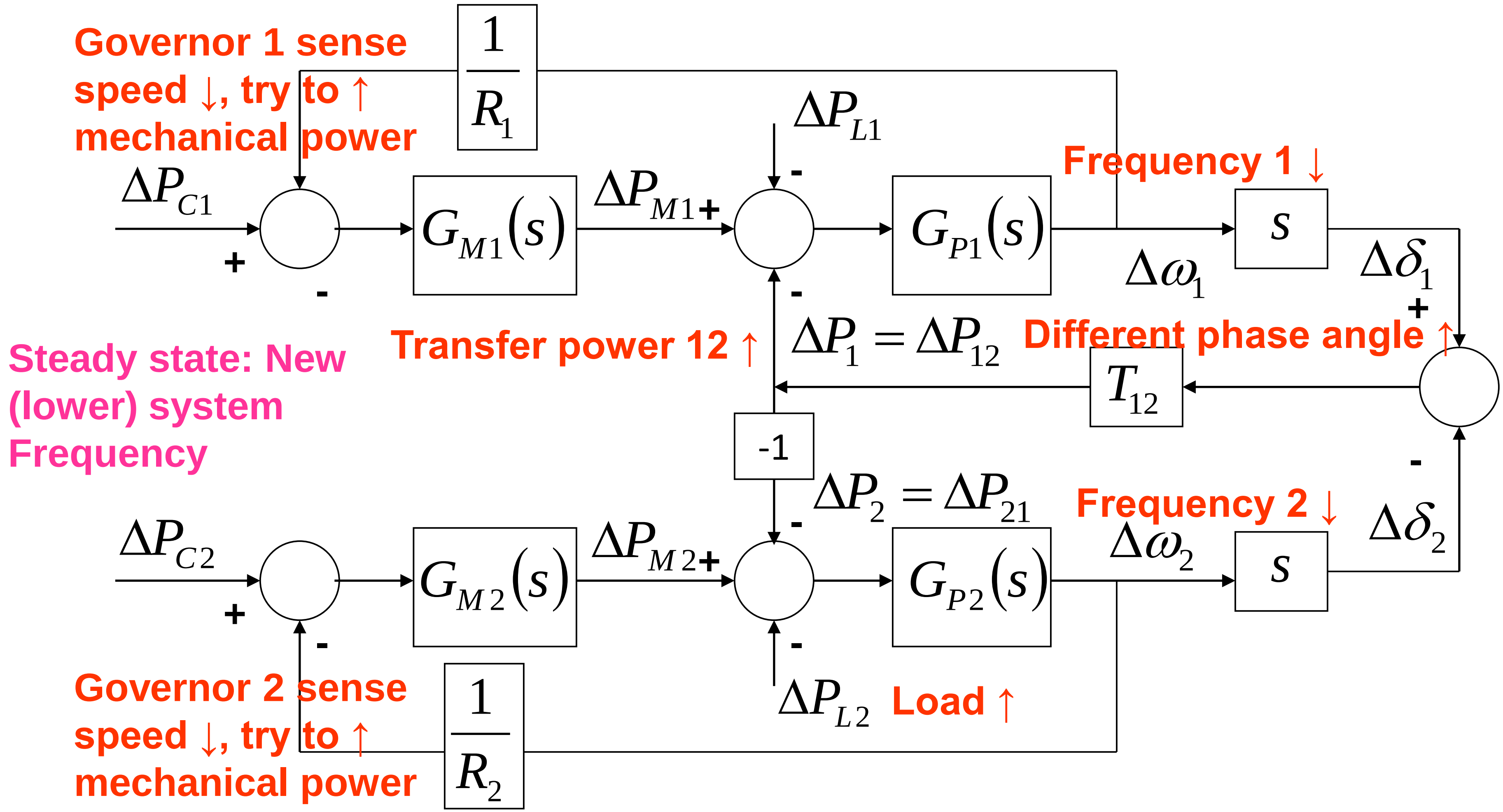
AGC FOR MULTI AREAS

- During transient period, sudden change of load causes each area generation to react according to its frequency-power characteristics.This is “called primary control”.
- This change also effects steady state frequency and tie-line flows between areas.
- We need to
  - Restore system frequency,
  - Restore tie-line capacities to the scheduled value, and,
  - Make the areas absorb their own load.
- This is called “secondary control”.

AGC FOR MULTIPLE AREA SYSTEM

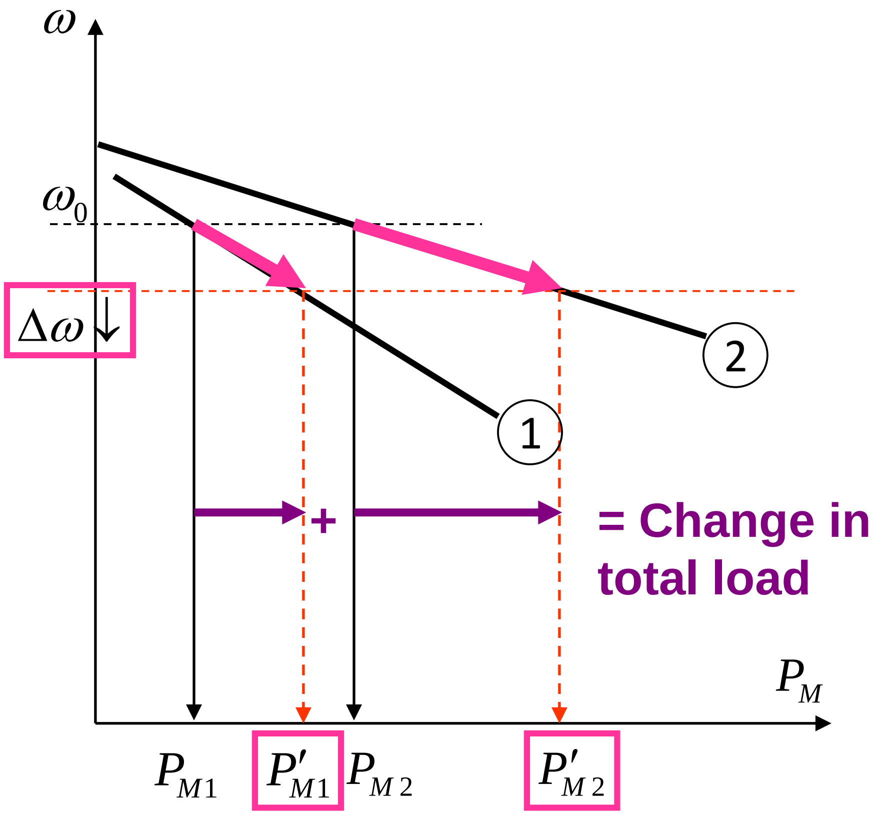


AGC FOR 2-GENERATOR: BLOCK DIAGRAM



AGC FOR 2-GENERATOR: STATIC SPEED-POWER CURVE

- Load increases.
- Frequency drops.
- Steady state is reached when frequency of both generators is the same.



STEADY STATE FREQUENCY CALCULATION: 2 GENERATORS

- From $\Delta P_{Mi} = M_i \Delta\dot{\omega}_i + \tilde{D}_i \Delta\omega_i + \Delta P_{Li} + \Delta P_i = \tilde{D}_i \Delta\omega_i + \Delta P_{Li} + \Delta P_i$
- Consider the frequency at steady state,

$$\Delta P_{M1} = \tilde{D}_1 \Delta\omega_1 + \Delta P_{L1} + \Delta P_{tie-line}$$

$$\Delta P_{M2} = \tilde{D}_2 \Delta\omega_2 + \Delta P_{L2} - \Delta P_{tie-line}$$

- But, $\Delta\omega = \Delta\omega_1 = \Delta\omega_2$, $\Delta P_{M1} = -\frac{1}{R_1}\Delta\omega$,and $\Delta P_{M2} = -\frac{1}{R_2}\Delta\omega$
- Then,

$$\Delta\omega = \frac{-\Delta P_{L1} - \Delta P_{L2}}{\left(\tilde{D}_1 + \tilde{D}_2 + \frac{1}{R_1} + \frac{1}{R_2}\right)}$$