

ELEC0047 - Power system dynamics, control and stability

Classification of power system instabilities

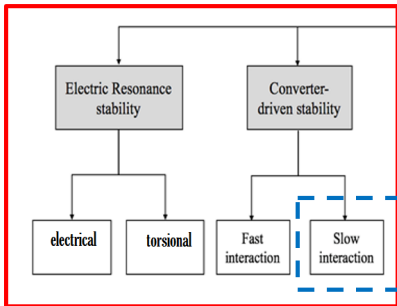
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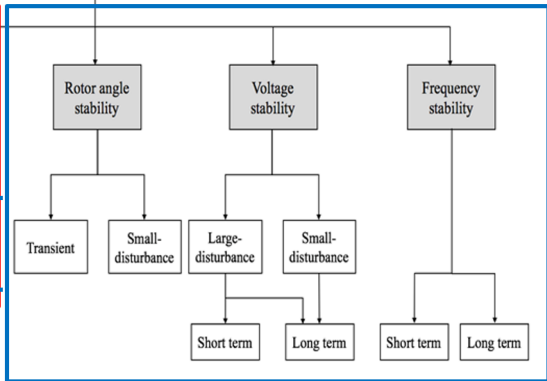
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Power system stability



Electromagnetic transient modeling required



Modeling under the phasor approximation appropriate

Rotor angle, voltage and frequency stability considered in this course

Stability : ability to operate and stay at equilibrium

- Rotor angle stability
 - ability to maintain synchronism between generators
 - there is an equilibrium between the mechanical and electromagnetic torques acting on each rotor
- Voltage stability
 - ability to maintain voltages near their nominal values
 - the combined transmission-generation system can deliver the powers requested by loads
- Frequency stability
 - ability to maintain frequency close to nominal value
 - there is an equilibrium between the total active power generated and the total active power consumed.

Typical (approximate) time frames

- short-term dynamics : they show their effects in 10 - 20 seconds
- long-term dynamics : they show their effects in a few minutes