Mechanical-to-Electrical Energy Conversion

4. Fundamental of Synchronous Generators

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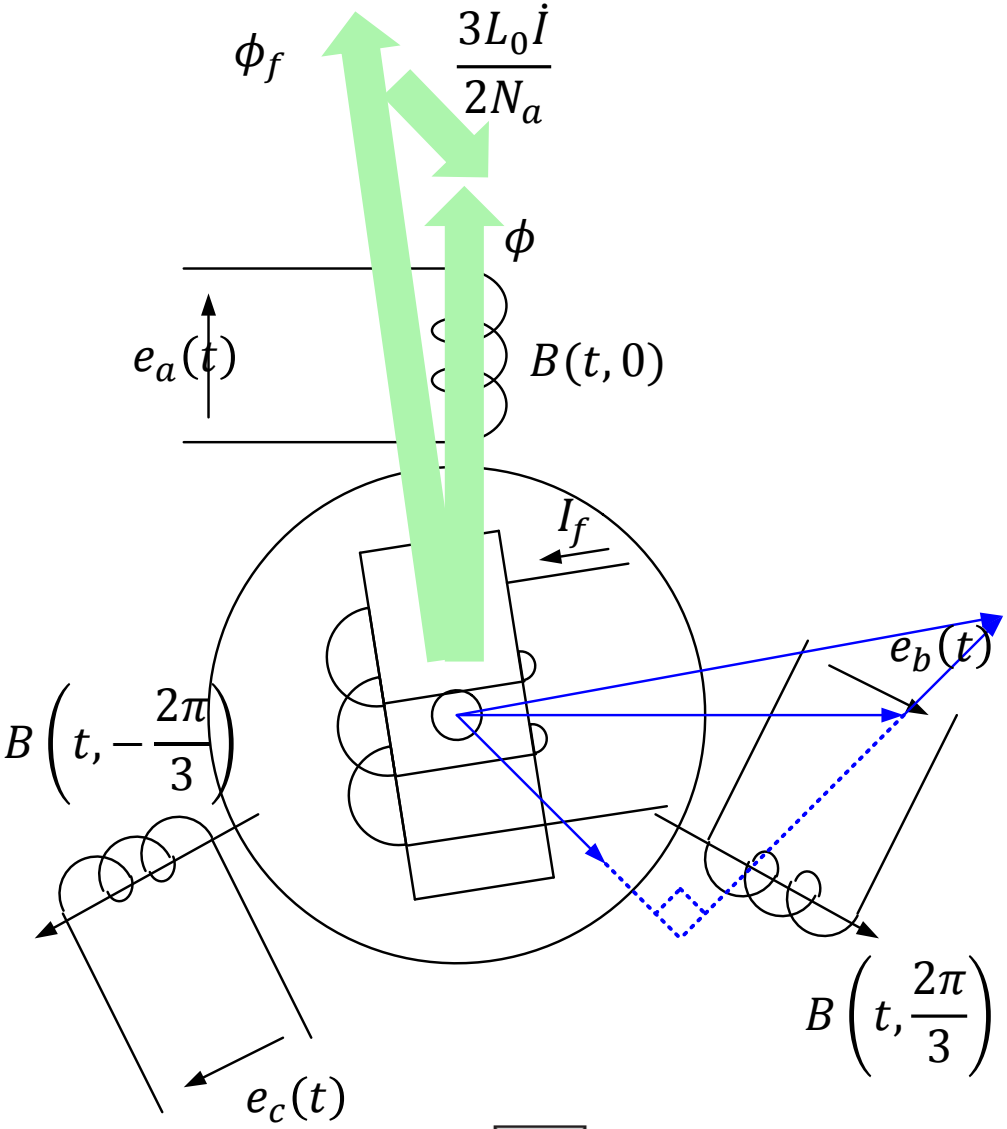
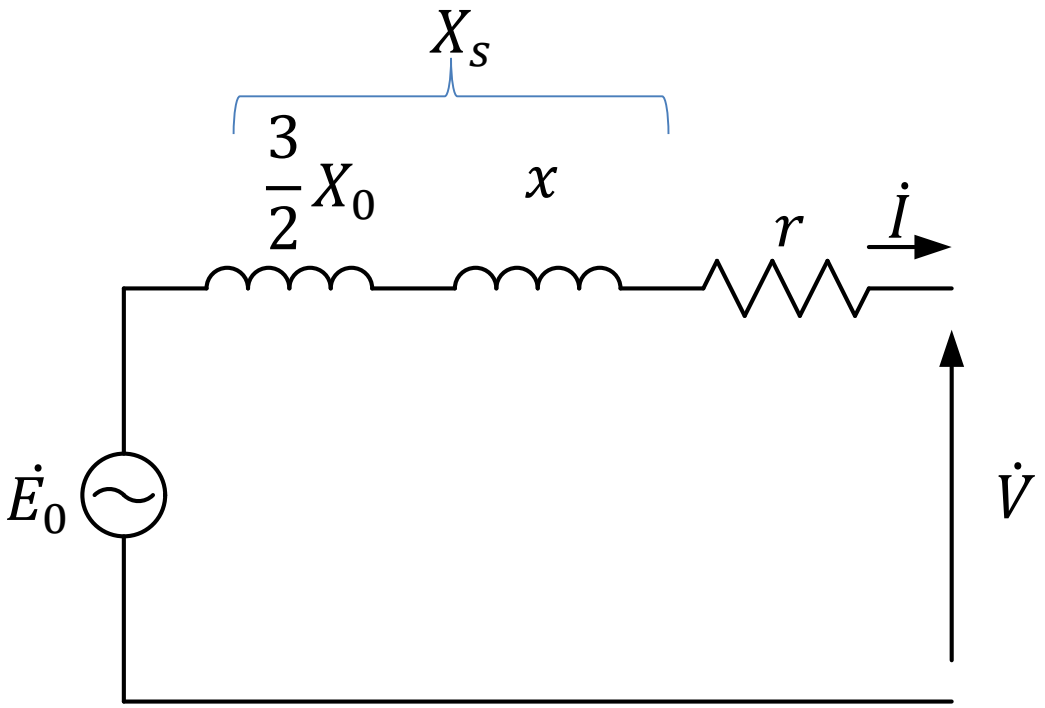
1. Structure of Synchronous Generators
2. Basic Principle of Synchronous Generators
3. Basic Characteristics of Synchronous Generators

EMF in Synchronous Generators



Single-Phase Equivalent Circuit

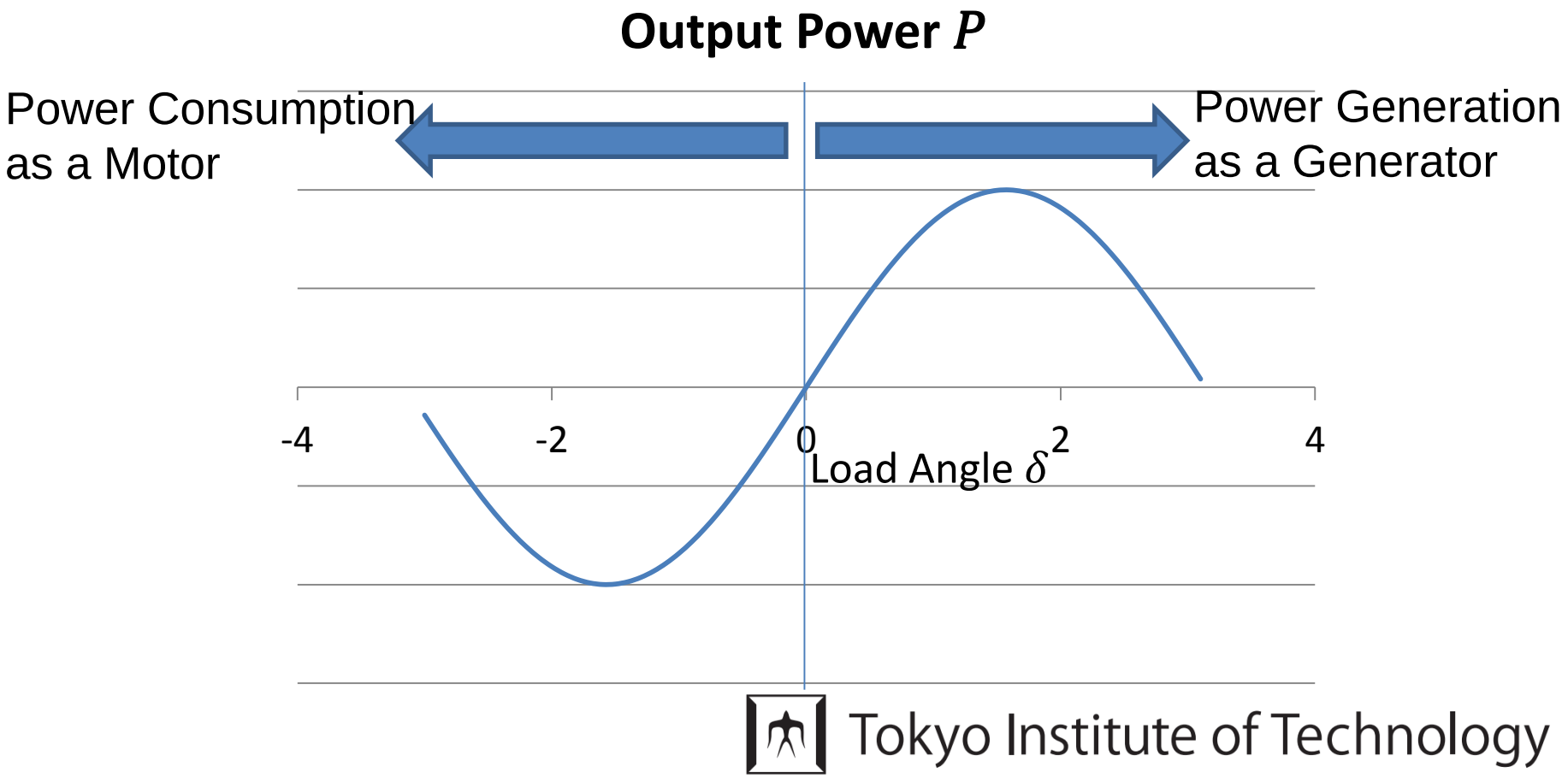


E_0: No-load Electromotive Force
X_0: Reactance of the Self Inductance
x: Leakage Reactance
r: Winding Resistance
X_s: Synchronous Reactance

Load Angle and Output Power

Output Power:

$$P = 3\frac{VE_0 \sin\delta}{X_s}$$



To be Continued in the Lecture…..