



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)



COIMBATORE-35

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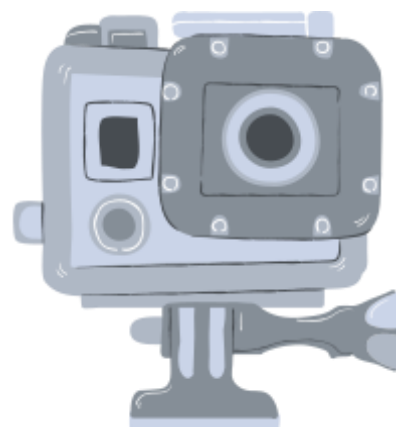
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

**COURSE NAME: 19EET207/ SYNCHRONOUS AND INDUCTION
MACHINES**

II YEAR / IV SEMESTER

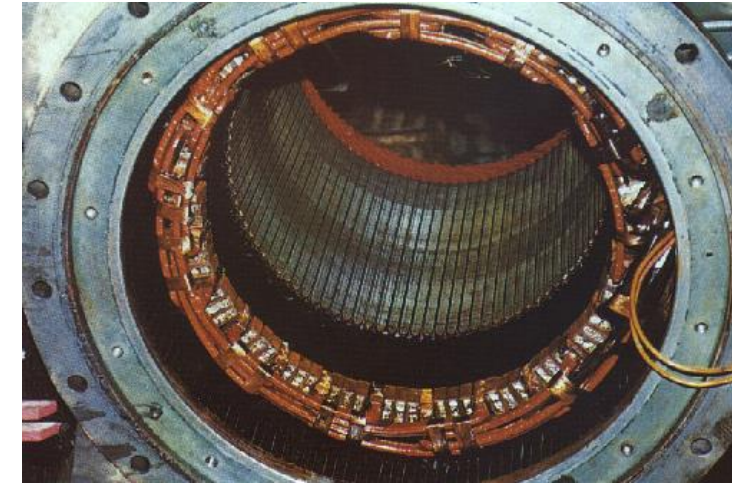
Unit 2 – SYNCHRONOUS MOTOR

Topic 8: Synchronous condenser

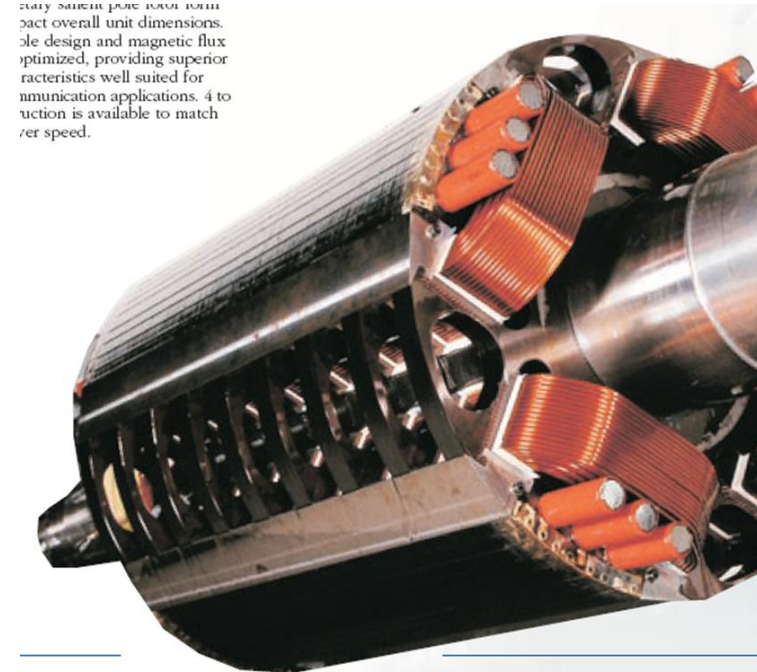




GUESS THE TOPIC NAME...

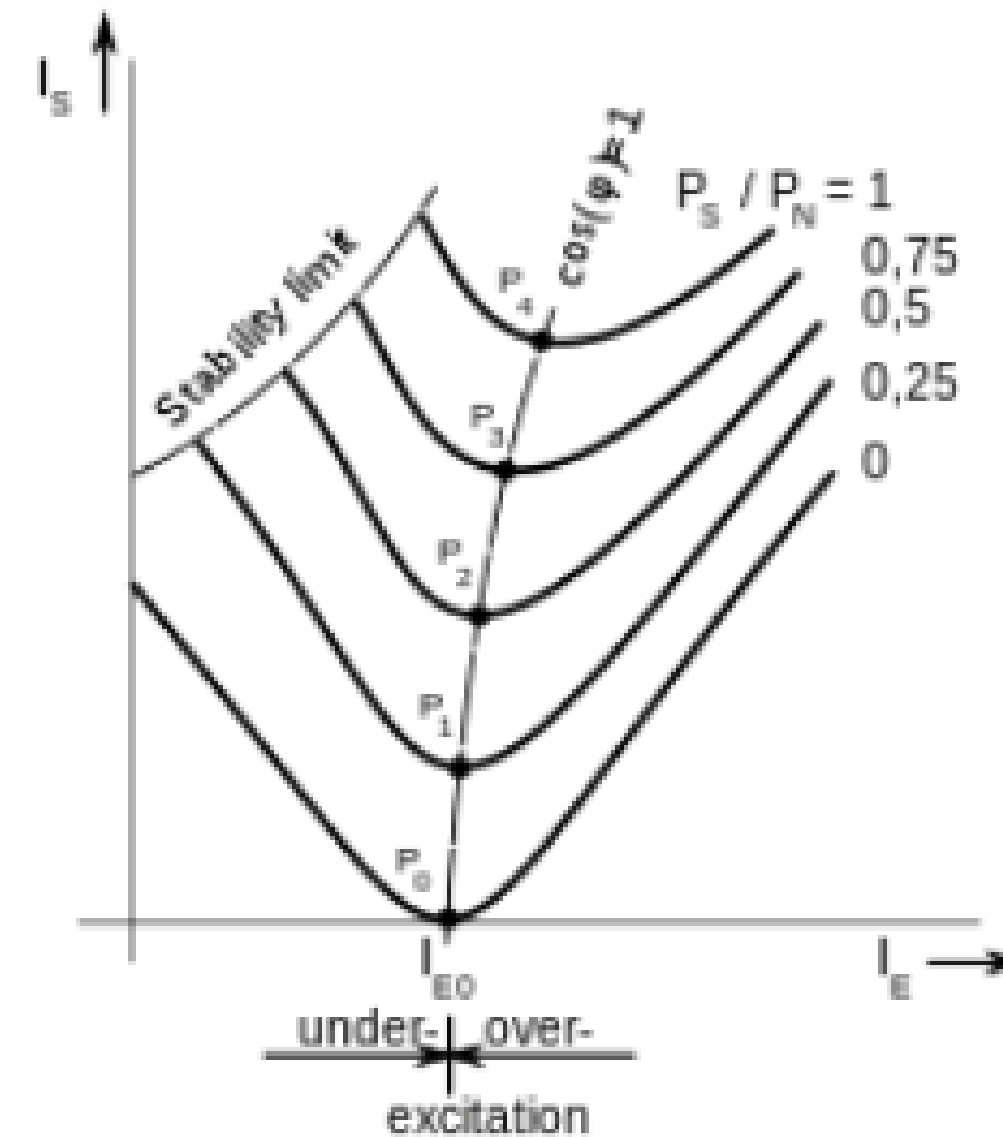
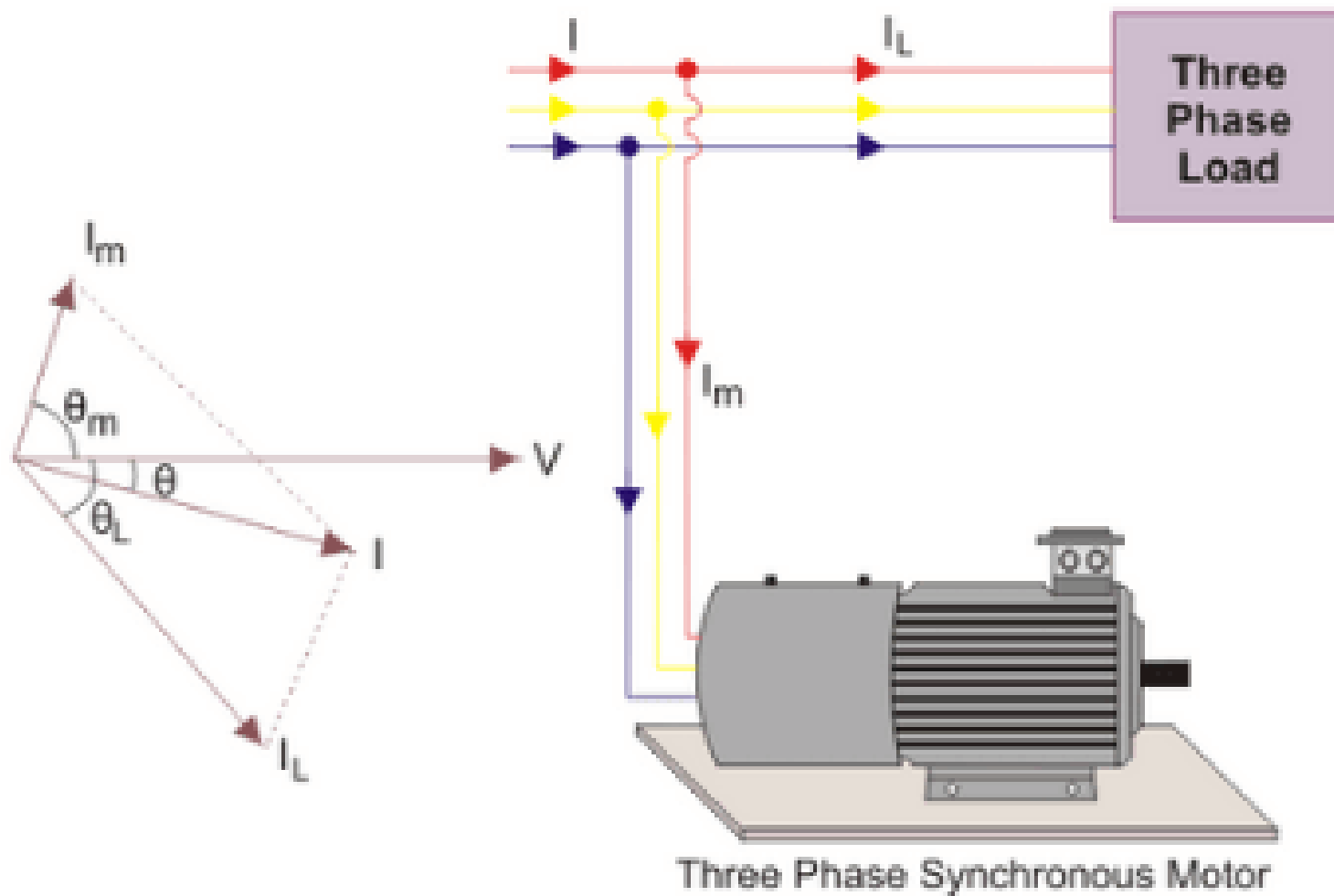


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Synchronous Condenser





Synchronous Condenser



- Like capacitor bank, we can use an overexcited synchronous motor to improve the poor power factor of a power system. The main advantage of using synchronous motor is that the improvement of power factor is smooth.
- When a synchronous motor runs with over-excitation, it draws leading current from the source. We use this property of a synchronous motor for the purpose.
- Here, in a three-phase system, we connect one three-phase synchronous motor and run it at no load.



Synchronous Condenser

- Suppose due to a reactive load of the power system the system draws a current I_L from the source at a lagging angle θ_L in respect of voltage.
- Now the motor draws a I_M from the same source at a leading angle θ_M . Now the total current drawn from the source is the vector sum of the load current I_L and motor current I_M .
- The resultant current I drawn from the source has an angle θ in respect of voltage. The angle θ is less than angle θ_L . Hence power factor of the system $\cos\theta$ is now more than the power factor $\cos\theta_L$ of the system before we connect the synchronous condenser to the system.



Synchronous Condenser



- The synchronous condenser is the more advanced technique of improving power factor than a static capacitor bank, but power factor improvement by synchronous condenser below 500 kVAR is not economical than that by a static capacitor bank. For major power network we use synchronous condensers for the purpose, but for comparatively lower rated systems we usually employ capacitor bank.
- The advantages of a synchronous condenser are that we can control the power factor of system smoothly without stepping as per requirement. In case of a static capacitor bank, this fine adjustments of power factor cannot be possible rather a capacitor bank improves the power factor stepwise.
- The short circuit withstand-limit of the armature winding of a synchronous motor is high.
- Although, synchronous condenser system has some disadvantages. The system is not silent since the synchronous motor has to rotate continuously.
- An ideal load less synchronous motor draws leading current at 90° (electrical).



SUMMARY

Synchronous Condenser



KEEP
LEARNING..
Thank u

SEE YOU IN NEXT CLASS