SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

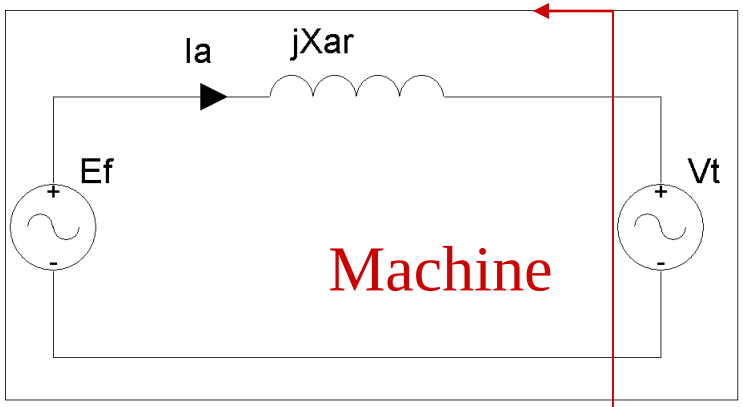
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE NAME : 19EE401 SYNCHRONOUS AND INDUCTION MACHINES

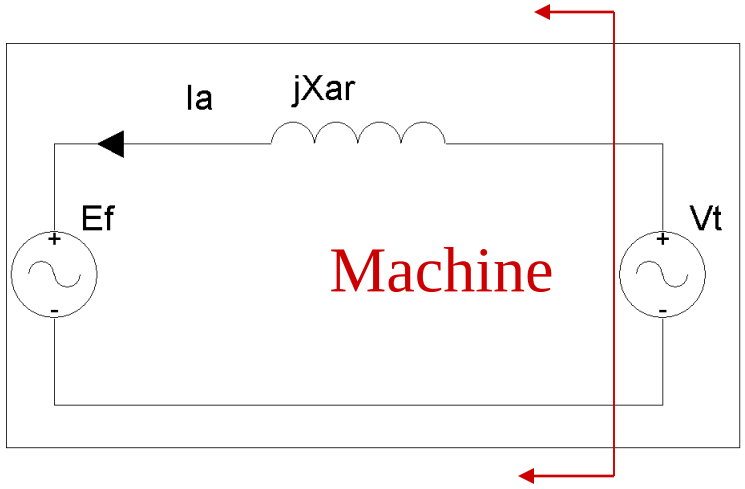
II YEAR /IV SEMESTER

UNIT – I SYNCHRONOUS GENERATOR

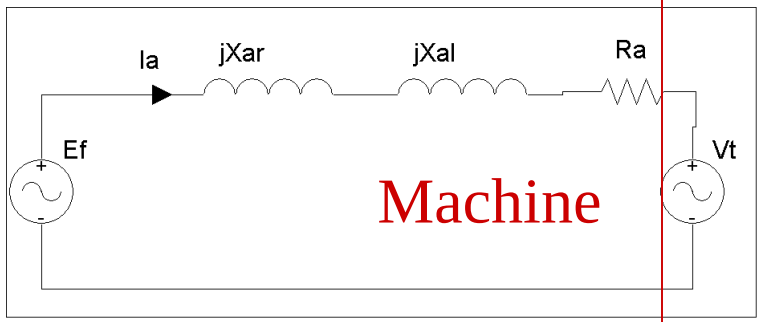
Equivalent circuit of Synchronous Machine



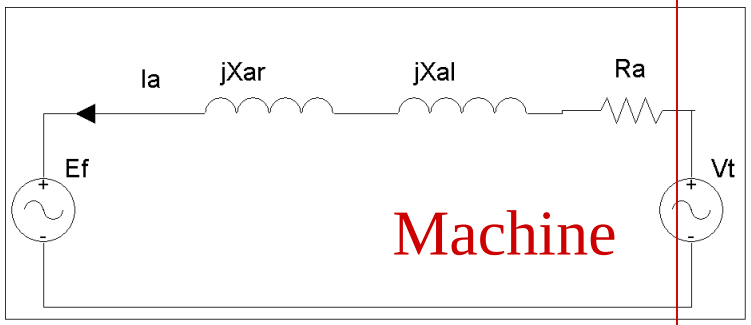
Generator (Appx.)



Motor(Appx.)



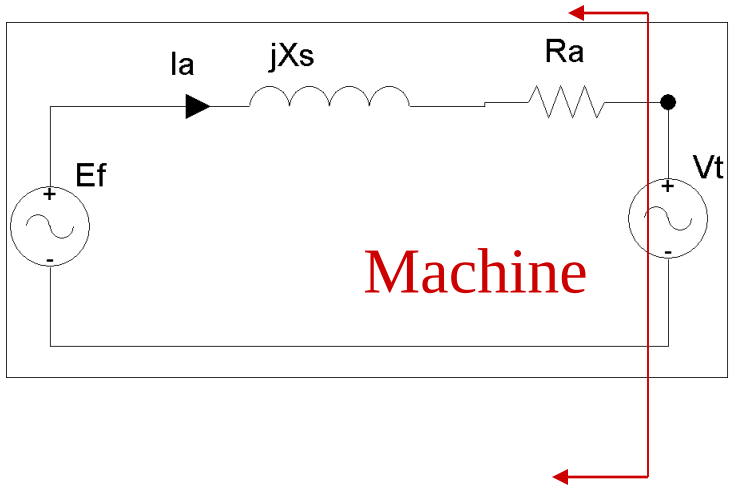
Generator (Exact)



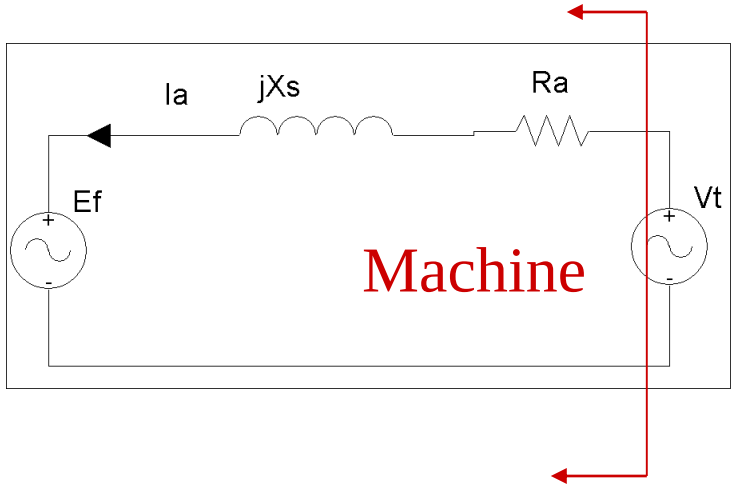
Motor(Exact)

•Only difference is in current direction; in a generator it flows out of it, in case of a motor it flows into it.

Equivalent circuit of Synchronous Machine



Generator (Exact)



Motor(Exact)

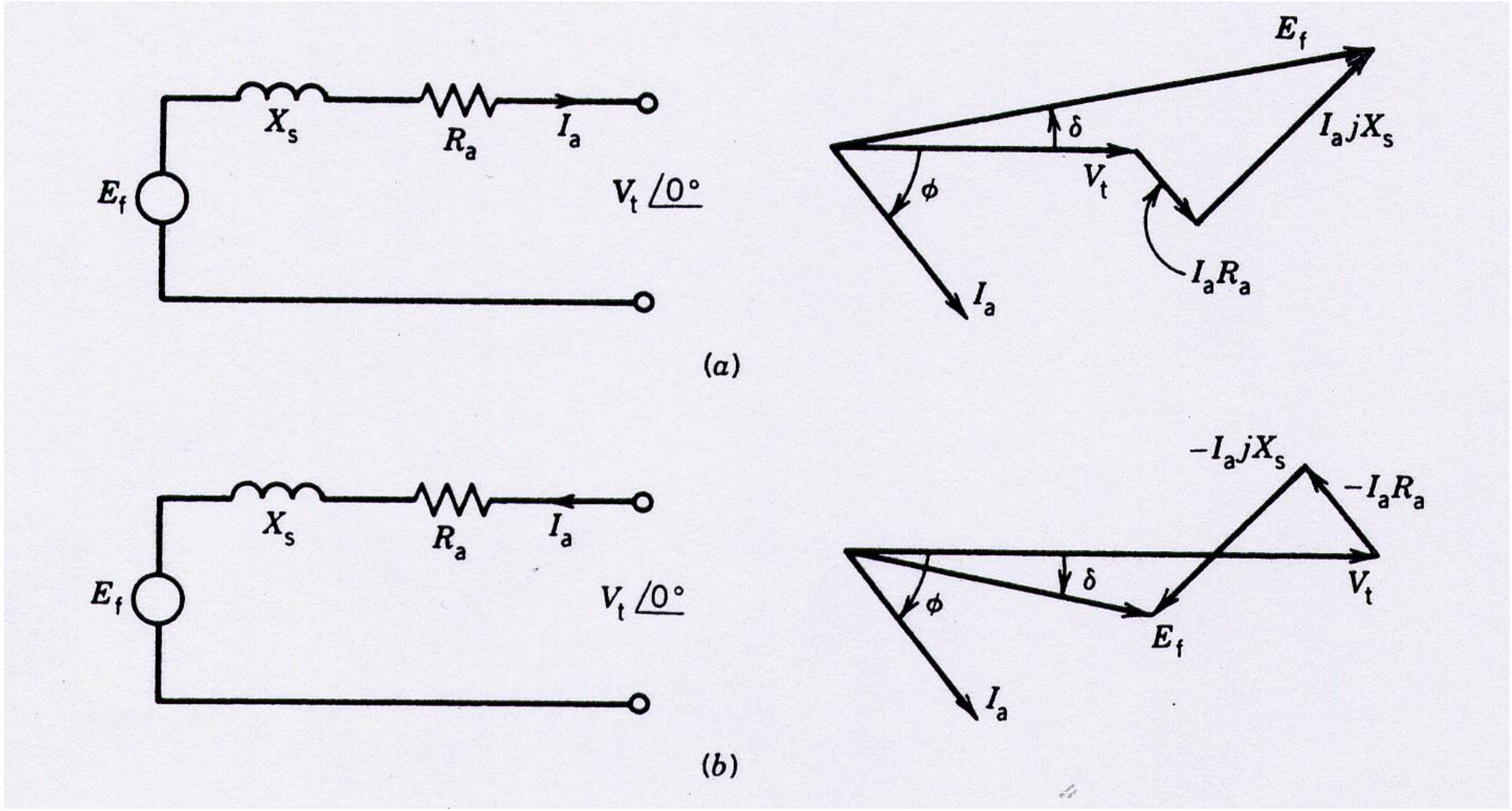
$X_s = X_{ar} + X_{al}$ (Synchronous reactance)

$Z_s = R_a + jX_s$ (Synchronous impedance)

X_{al} is leakage Reactance

R_a is armature resistance

Phasor Diagram of Synchronous Machine



Note: δ is +ve for (a) generator and –ve for (b) motor

REFERENCES

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- Fitzgerald, A.E., Charles Kingsley, Stephen. D. Umans, “Electric Machinery”, Tata McGraw Hill Publishing Company Limited, 2013.
- Murugesh Kumar, K., “Induction and Synchronous machines”, Vikas Publishing House Private Ltd, 2016.

THANK YOU