**Lab 6: Induction Machines**

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**Objective**

In this lab, we will be examining the different characteristics of the induction motor and generator at different levels of loading and terminal voltages. We will also determine the

relationship between input and output power for a given speed and torque conditions.

**Motor Name Plate and Predicted Values**

Table

Description automatically generated

Full Load Power = 746W \* 2.5HP = 1.865 KW

Torque=

Nsync= = 1800 rev/min

Slip =

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Estimated parameters (per phase equivalent circuit)** | | | | | |
| **R1** | **X1** | **Rc** | **Xm** | **X2** | **R2** |
| 1.62 | 1.202 | 0.4132 | 30.306 | 1.202 | 0.130 |

R1+R2 =

X1+X2 =

Zeq =

R1 = 1.62 (found from Part A)

X1 = X2 = = 1.202j

Rc = = 0.413 ohm

Xm = Zeq – X1 = 31.508-1.202 = 30.306j

R2 = (R1 +R2) – R1 = 1.75 – 1.62 = 0.13 ohm

**Part 1: Stator Resistance Measurement**

Diagram

Description automatically generated

Figure 1: Circuit diagram for induction machine stator resistance measurement

R1 = 1.62 ohm

**Part B: Locked Rotor Test (Short Circuit Test)**

Diagram

Description automatically generated

R1+R2 =

X1+X2 =

**Part C: Operation Characteristics at varying loads**

SAME WIRING AS PART B

**Part D: Synchronous Operation Test (Rotor Open Circuit Test)**

Diagram, schematic

Description automatically generated

Zeq =

Rc = = 0.413 ohm

**Part E: Induction Generator**

SAME WIRING AS PART D

We get negative Torque because the force is in the opposite direction as the motor is now a generator in this setup

**Questions**