`Lab Session 7
(1-5 April 2024)

Reference Book: S. J. Chapman; 4th Edition, Chapter 4.

Objective: Create and execute a Matlab Program that simulates:

(a) Rotating Magnetic Field

If a three-phase set of currents, each of equal magnitude and differing in phase by 120°, flows in a three-phase winding, then it will produce a rotating magnetic field of constant magnitude.

Observe the following:

(i) What will happen when the current in any two of the three coils is swapped?

(ii) What would be the effect of variation of the amplitude of currents in each phase?

(iii) What would be the effect of variations in phase angles?

(iv) What would be the effect of increasing / decreasing the value of electrical frequency?

(v) What would be the effect of incorporating more sets of three-phase winding, *i.e.*, increasing the number of magnetic poles?

(b) Interaction of the magnetic field produced by a current carrying one-loop rotor with the rotating magnetic field of the three-phase stator windings.

Observe the following:

(i) Is the loop's magnetic field trying to align with the rotating magnetic field?

(ii) If yes then what is the mechanical speed of the loop's magnetic field?

(iii) What would be the effect of variations in the initial mechanical angle between the two fields?

The 'Lab Record' must includes the following:
1. **Description of the Model to be created and executed**
2. **Schematic diagram**
3. **Program Code**
4. **Observations**
5. **Results**