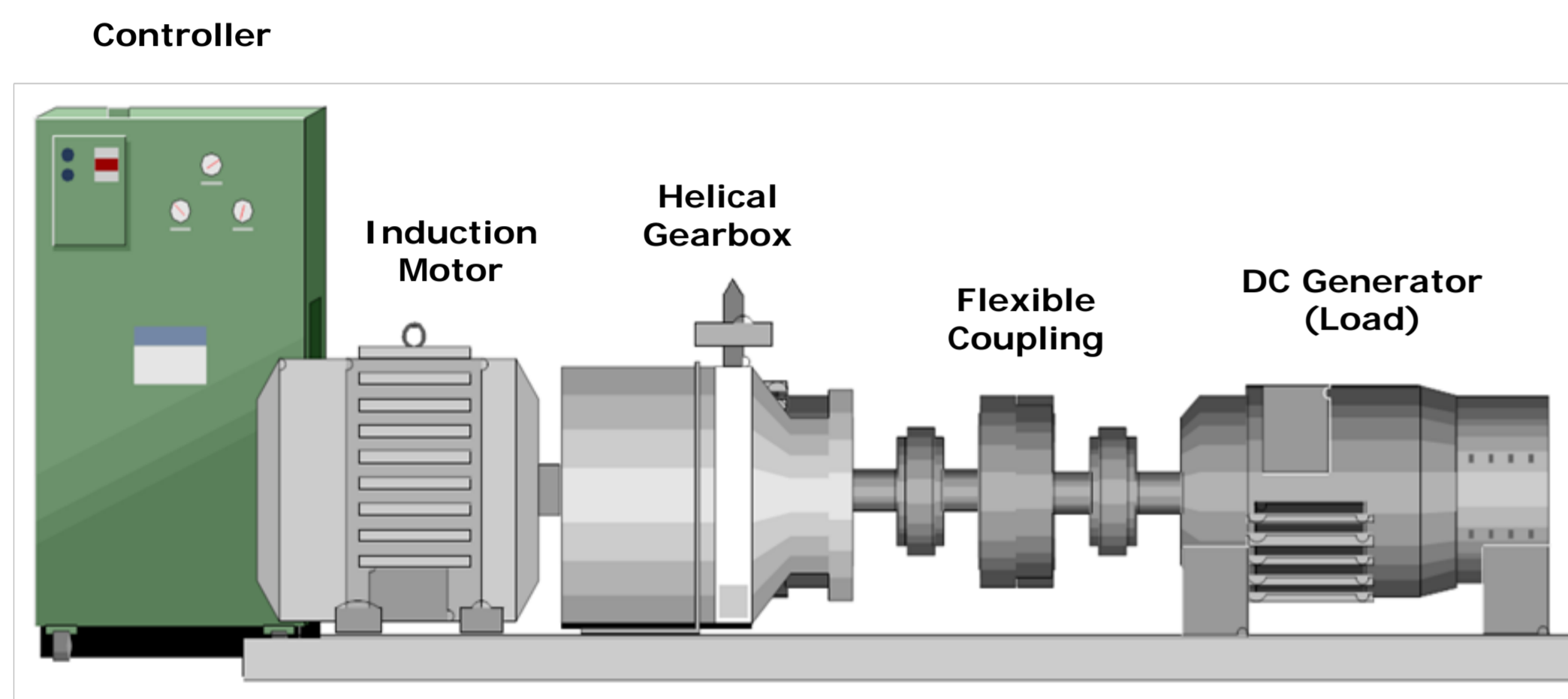


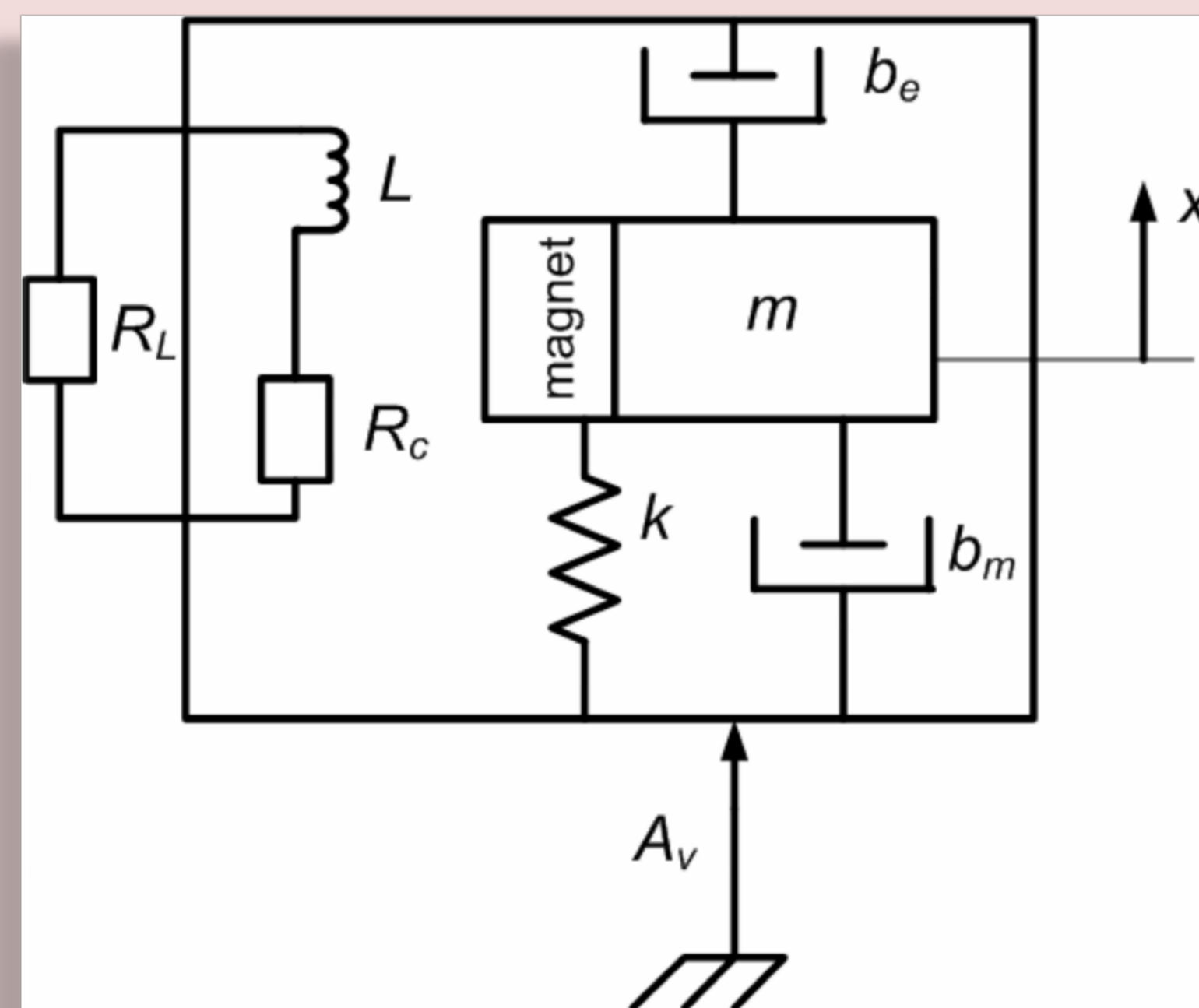
## Experimental Test Rig



## Condition Monitoring Methods for Electrical Drives

1. Motor Current Signature Analysis (MCSA)
2. Induction machine condition monitoring using notch-filtered motor current
3. Parameter estimation using Genetic Algorithm (GA)
4. Instantaneous Angular Speed (IAS)
  - Band-pass filtering.
  - Analytic representation (Hilbert transform).
  - Carrier frequency removal (frequency shifting).
  - Angle calculation and differentiation.

## SOMA Used for the Optimisation of Ambient Vibration Energy Harvesting



### SOMA

- Self-Organizing Migrating Algorithm
- Optimisation using Artificial Intelligence

### $A_v$ Ambient Vibration

### Mechanism

- Mechanical part (mass  $m$ , spring  $k$ , damper  $b_m$ )
- Electromagnetic Energy Converter (coils  $L$  and  $R_c$ )
- Electrical Load  $R_L$

**Optimisation** can help in generating the maximum amount of electrical power

### Next Steps

- Improve the quality factor of the model
- New harvester design for wireless application

## Design of Expert System

