Artificial Intelligence-Based Condition Monitoring for Practical Electrical Drives

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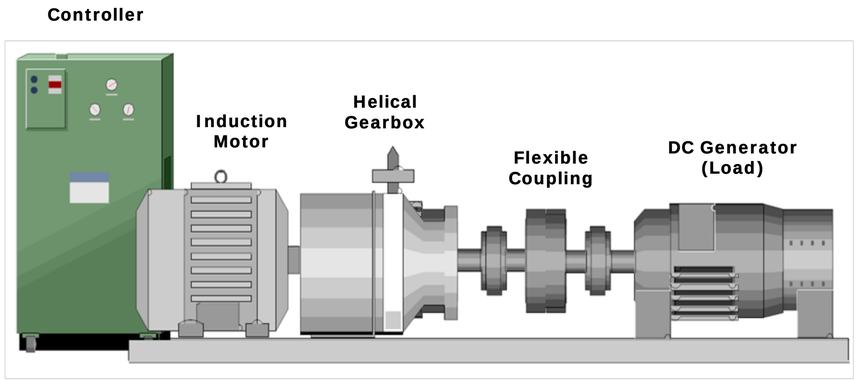
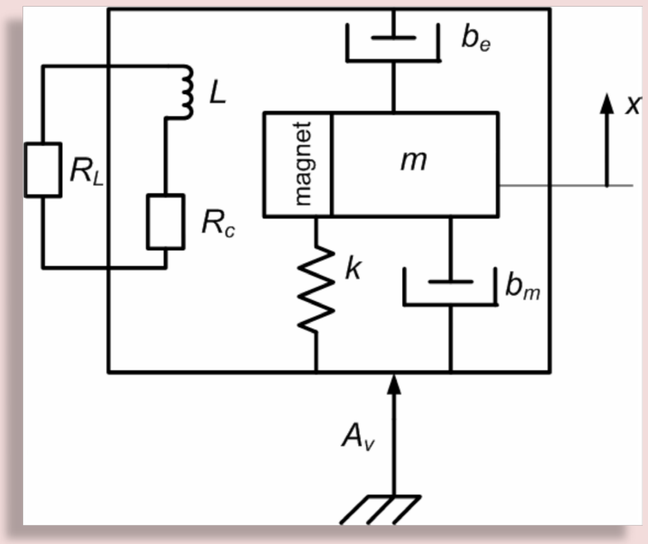
Experimental Test Rig



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