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Artificial Intelligence-Based Condition Monitoring for Practical Electrical Drives

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Diagnostic Engineering Research Centre
Computing and Engineering

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