ARTIFICIAL INTELLIGENCE-BASED CONDITION MONITORING FOR PRACTICAL ELECTRICAL DRIVES

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ABSTRACT

The main types of existing Condition Monitoring methods (MCSA, GA, IAS) for electrical drives are described. Then the steps for the design of expert systems are presented: problem identification and analysis, system specification, development tool selection, knowledge based, prototyping and testing.
The employment of SOMA (Self-Organizing Migrating Algorithm) used for the optimization of ambient vibration energy harvesting is analyzed. The power electronics devices are becoming smaller in size and consume less power so they are well suited for ambient vibration conversion systems for charging batteries or supplying power directly. The springless resonance mechanism has a mechanical part (mass, spring, damper), an electromagnetic energy converter (coils) and electrical load. SOMA is an artificial intelligence algorithm which is used to find the best combination of independent parameters to optimize the device and obtain the maximum amount of electrical power. Future research will be done to improve the quality factor of the model and to use it for a new harvester design for wireless applications.

Keywords *artificial intelligence, condition monitoring system, electrical drives, expert system, energy harvesting*