## 19WN146 Experimental Results on Magnetic Cores for Magnetic Induction-Based Energy Harvesting

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In this work it is presented an energy harvesting system based on disperse magnetic energy produced by electric current across power line of a power distribution network in order to supply energy for devices in a wireless sensor network. The system is based on toroidal cores tested and validated with different materials and dimensions (five based on ferrite, seven based on nanocrystalline, seven based on iron powder) aiming harvesting optimal power device. From principles of magnetic ferromagnetic materials, it is discussed the magnetic field theory to obtain energy for supplying power to devices. It was implemented a prototype consisting of a test bench capable of emulating power-line high currents and of a power conditioning circuit. Test procedures were executed in three parts. The first was to determine the magnetic parameters (e.g. relative permeability and magnetic curve) of each harvester using a circuit able to measure core permeability in order to obtain B x H cycle. The second was to test a proposed power conditioning circuit composed of an AC/DC rectifier and a voltage regulator. The third, the experimental results were compared with theoretical ones. The obtained experimental results have been in agreement with theory, showing that the energy harvesting system is capable of supplying up to 315.6 mW from ferrite based core, 54mW from nanocrystalline based cores and 0.77mW from iron powder based ones, by capturing magnetic dispersion produced by a 15A current in the power line, which can be applied to various low power devices, mainly in wireless sensor network for data acquisition and control parameters of the power line itself.
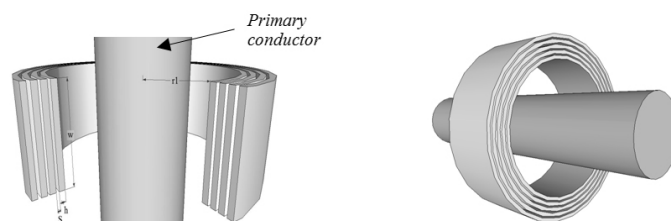

The simple scheme of an energy harvesting system based on disperse magnetic energy.

20MT102 Measuring system and power management of the Guanay II AUV

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This paper presents a measurement system and energy management for Guanay II autonomous underwater vehicle (AUV). The system performs the measurement, monitoring and control of the state of charge of the batteries, allowing simultaneous charging of all batteries from outside of the vehicle, and a wireless connection/disconnection mode. Considering the type of batteries used in the vehicle, it is used the current integration as methodology for measuring the charge level of the battery. Laboratory and vehicle navigation tests performed have validated the correct operation of the system and the reliability of the measured data. These data are sent to the mission control of the vehicle in order to optimize and guarantee its navigation.

Keywords– state of charge, batteries, AUV
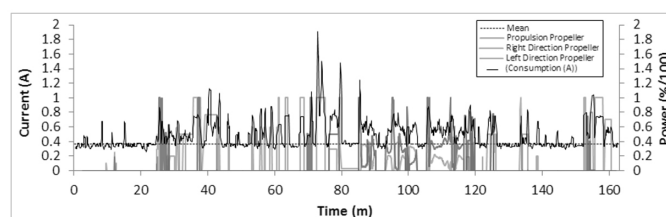
Consumption of the vehicle versus power of the propellers