Abstract:

This article's goal it's to present a method to optimize a linear electrical conversion chain for a thermos-mecanic-electrical micro-cogeneration system using a Stirling technology. To begin, the principle of micro-cogeneration system is explained then a description of the electrical chain is developed.

Introduction:

A micro-cogeneration is used like a thermal/energy supplier in individual dwelling. It's composed of two Stirling type driving motors (which work in phase opposition, it means that the release time of the first piston corresponds with the compression time of the second piston) associated to linear electrical inductive generator. Because of congestion issues, the choice of the integration of driving motor has been made. So, the system is composed of thermo-mechanic chain coupled to an electro mechanic chain. The electrical energy created is injected to domestic single-phase network (230V-50Hz) via a double convertor (AC/DC/AC). Pistons (one for each motor) are rigidly connected, so we considered that there is only one piston which is driven by alternative motion according to its axis. Its frequency and its amplitude depend on the temperature and electromagnetic force (opposed to motor rotation). This is this force which permits to optimize a good working of the thermo-mechanic chain in terms of stability.

This kind of Stirling motors are not naturally stable. That's why this stability has to be controlled and commanded by inductive Machin which, mainly, works as a generator during a cycle but sometimes, it can work as motor.

Model and methodology for optimization.

The goal, in this part, is to present a global method to optimize the sizing and models used. The tool used is NSGA II algorithm.

SMART BUILDING: TOWARDS OPTIMUM ENERGY MANAGEMENT

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Living comfort is a notion related to intelligent home installations. This perception, for each, allows simplify the lives of the occupants of the home. Intelligent home consists mainly of a complex integration of technologies, electric and thermal materials, telecommunications and computerization. More specifically, the thermal comfort, security and safety of intelligent home with an optimize exploitation of energies consumed are important issues. In order to quantify the first concept, the energy performance of

building is developed. This represents the amount of energy consumed in a precise way.

Today the environmental awareness and maintaining comfort of residents are leading to a rethinking of the integration and utilization about innovative solutions for the habitat to offer more functionalities and better energetic performance.

Emerging of news computing technologies and communication on the home automation domain (Ethernet network, on-board Web server, e-mail and messages service, supervisory screen…) helps against some potential dysfunction or control parameter remotely.

To complement the first aspect related to access to information, a second research axis concern the strategy command to execute knowing that the main item is to minimize the energy used by a building. For example, it can be more interesting for an objective of thermal comfort in a room to act on the windows automatically applied then used reversible air-conditioning. However, this reasoning is valid for a room but it can't be valid for a house because of the different sun exposure. More generally, the command strategy to execute has to satisfy the constraints imposed by intelligent home for the comfort, the security and also the energetic consuming.

References:

1. Smart building: vers une gestion énergétique optimisée written by Fabien Clanche, Jérôme Gautier and Frédéric Hamelin. Published on https://hal.archives-ouvertes.fr/hal-00827454

THE STORAGE OF ELECTRICAL ENERGY. CAPACITORS AND SUPERCAPACITORS

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This article gives an overview of a fundamental problem of electrical engineering: the storage of electrical energy. And with the decreasing resources, storage of electrical energy is more than ever a necessity. An evolution is observable in this area but energy demand is still increasing. So we talked a primary means of storage: the capacitors.

In capacitors, the energy $W = ½ C.V^2$ is limited by the dielectric breakdown of the insulation. But it also proportional to its disruptor field (Ed) and permittivity (Eo.Er) $W = ½ Er.Eo.Ed^2$. There are different technologies capacitors:

Electrolytic technology but it is limited in voltage, energy as well as discharge power.