

P. Grandelag, "Energy-efficient cooling for telecom networks: Thermosiphon as energy savings generator," *2015 IEEE International Telecommunications Energy Conference (INTELEC)*, Osaka, 2015, pp. 1-3.

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Abstract: Each year, the highest costs in Telecom network shelters and cabinets are not related to personnel or construction, but to energy consumption. The highest proportion of energy costs derive from the energy consumption of electronics cooling units, which run around the clock to ensure well-balanced running temperatures for the enclosed electronic equipment. Technologies designed to reduce energy emissions in the electronics cooling industry get increasing attention every day. Choosing an energy-optimizing cooling solution is essential to bringing down the overall network costs. An energy-optimizing cooling solution incorporates a variety of parameters, the most important of which are correct capacities according to the individual site as well as energy-optimizing cooling strategies. Further parameters include specific temperature requirements, humidity level, air quality and the like. Dantherm's technologies are customized for the Telecom industry and designed specifically to reduce energy costs in network shelters and cabinets. Many years of research and development have resulted in a product range comprising of active and passive cooling solutions which utilize state-of-the-art free cooling, Thermosiphon and dual zone cooling technologies.

keywords: {cooling;cost reduction;energy conservation;power consumption;telecommunication industry;telecommunication power management;Thermosiphon technologies;dual zone cooling technologies;electronics cooling industry;electronics cooling units;enclosed electronic equipment;energy consumption;energy cost reduction;energy costs;energy emission reduction;energy saving;energy-efficient cooling;energy-optimizing cooling solution;free cooling technologies;telecom industry;telecom network cabinets;telecom network shelters;Energy efficiency;Heating;Mars;Power demand;Refrigerants;Telecommunications},

URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7572486&isnumber=7572261>

R. Wang, V. T. Tran, F. Gu and A. D. Ball, "An investigation on energy recovery analysis of active suspension system," *2013 19th International Conference on Automation and Computing*, London, 2013, pp. 1-6.

Abstract: Currently active suspension system is more applicable than passive for improving the suspension performance, ensuring the stability and passenger safety in modern automotive suspension system. However, high energy consumption is one of the main disadvantages of implementing this system in real applications. In this paper, the energy consumption of electromagnetic actuators used for an active suspension system controlled by proportionalintegral-derivative (PID), fuzzy adaptive PID, and neuron adaptive PID are investigated through simulation studies. Based on the energy consumption and the performance analysis, it has found that it is potential to develop a vibration energy recovery system to achieve the energy balance requirement in active suspension systems.

keywords: {electromagnetic actuators;energy consumption;heat recovery;performance evaluation;safety;stability;suspensions (mechanical components);active suspension system;automotive suspension system;electromagnetic actuators;energy consumption;energy recovery analysis;fuzzy adaptive PID;neuron adaptive PID;passenger safety;performance analysis;proportionalintegral-derivative;stability;Actuators;Electromagnetics;Energy consumption;Roads;Suspensions;Vehicles;Vibrations;active suspension;controls;electromagnetic;energy recovery},

URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6662053&isnumber=6661997>

A. Reaz, V. Ramamurthi, M. Tornatore and B. Mukherjee, "Green Provisioning of Cloud Services over Wireless-Optical Broadband Access Networks," *2011 IEEE Global Telecommunications Conference - GLOBECOM 2011*, Houston, TX, USA, 2011, pp. 1-5.

doi: 10.1109/GLOCOM.2011.6134394

Abstract: Today's access networks are increasingly shaped by the services that they provide to the end users. In a hybrid wireless-optical broadband access network (WOBAN), to access any service, connection requests require multi-hop communications over the wireless mesh network (WMN) and the Passive Optical Network (PON), and subsequently over the Internet to some server in the service provider's domain. To improve the delivery of such services over WOBAN, we can design a Cloud-Integrated WOBAN (CIW) by deploying a few cloud components (CCs) in the WOBAN itself and serve local services from these local CCs. In this paper, we propose a novel energy-saving routing mechanism, called Green Routing for CIW (GRC), that manages the activation of network components, namely ONUs and CCs, to minimize the overall energy consumption of CIW. It performs load-balanced anycast routing across active devices. Our performance evaluation shows that GRC operates with low average packet delay and achieves significant energy savings by turning off about 50% of the ONUs and about 20% of the CCs.

keywords: {broadband networks;cloud computing;optical fibre networks;passive optical networks;performance evaluation;radio access networks;resource allocation;telecommunication computing;telecommunication network routing;wireless mesh networks;CIW;GRC;Internet;WMN;average packet delay;cloud components;cloud services;cloud-integrated WOBAN;connection requests;energy consumption;energy savings;energy-saving routing mechanism;green provisioning;green routing;hybrid wireless-optical broadband access network;load-balanced anycast routing;local services;multihop communications;network components;passive optical network;performance evaluation;service provider domain;wireless mesh network;wireless-optical broadband access networks;Delay;Optical network units;Passive optical networks;Peer to peer computing;Routing;Wireless communication;Wireless sensor networks},

URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6134394&isnumber=6133457>

I. Aharon and A. Kuperman, "Topological Overview of Powertrains for Battery-Powered Vehicles With Range Extenders," in *IEEE Transactions on Power Electronics*, vol. 26, no. 3, pp. 868-876, March 2011.

doi: 10.1109/TPEL.2011.2107037

Abstract: The paper presents a topological overview of hybrid powertrains for battery-powered vehicles reinforced by range extenders. First, tradeoffs of employing high energy versus high power battery are revealed. Then, different topologies of battery-ultracapacitor hybrids are discussed, highlighting pros and cons of each configuration. The superiority of fully active hybrids is indicated, obtained at the expense of increase of power electronic circuitry, control effort, and efficiency. The second part of the paper focuses on two types of range extenders: renewable energy and fuel-based units. The operation strategy is shown to be different for each range extender type. The renewable-energy-based range extender should be operated employing either passive or active maximum power point tracking strategy and hence not be involved in the powertrain energy balancing. It is shown that such a strategy allows the rest of system to perceive the renewable energy range extender (RERE) as a part of the load and act accordingly. Solar array is given as an example of a RERE and the possible connection topologies are discussed. On the other hand, the fuel-based range extender (FBRE) should be operated near the lowest specific fuel consumption point employing maximum efficiency point tracking strategy. Fuel cells and internal combustion engines are specified as examples of FBREs. The complete powertrain is shown to resemble a dc microgrid with source, storage, and load units connected through power management circuitry to a common dc link.

keywords: {battery powered vehicles;distributed power generation;fuel cells;maximum power point trackers;supercapacitors;DC microgrid;FBRE;RERE;battery-powered vehicles;battery-ultracapacitor;fuel cells;fuel consumption;fuel-based range extender;fuel-based units;internal combustion engines;maximum power point tracking strategy;power electronic circuitry;power management circuitry;powertrain energy balancing;renewable energy range extender;solar array;topological overview;Energy storage;Fuels;Mechanical power transmission;Renewable energy resources;Topology;Vehicle dynamics;Vehicles;Batteries;dc microgrids;electric propulsion;electric vehicles;fuel cells;internal combustion engines (ICEs);power converters;range extenders;renewable energy;ultracapacitors},

URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5692836&isnumber=5767815>

R. Gosangi and R. Gutierrez-Osuna, "Energy-aware active chemical sensing," *2010 IEEE Sensors*, Kona, HI, 2010, pp. 1094-1099. doi: 10.1109/ICSENS.2010.5690812

Abstract: We propose an adaptive sensing framework for metal-oxide (MOX) sensors that seeks to minimize energy consumption through temperature modulation. Our approach generates temperature programs by means of an active-sensing strategy combined with an objective function that penalizes power consumption. The problem is modeled as a partially observable Markov decision process (POMDP) and solved with a myopic policy that operates in real time. The policy selects sensing actions (i.e., temperature pulses) that balance misclassification costs (e.g., chemicals identified as the wrong target) and sensing costs (i.e., power consumption). We experimentally validate the method on a ternary chemical discrimination problem, and compare it against a "passive classifier." Our results show that, for a given energy budget, the active-sensing strategy selects temperatures with more discriminatory information than those of the passive classifier by penalizing pulses of higher temperature and longer durations.

keywords: {Markov processes;adaptive systems;chemical sensors;chemical variables measurement;intelligent sensors;active sensing strategy;adaptive sensing framework;energy aware active chemical sensing;metal oxide sensor;myopic policy;partially observable Markov decision process;selects sensing actions;temperature modulation;temperature pulse;ternary chemical discrimination},

URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5690812&isnumber=5689839>

G. W. Chang and C. M. Yeh, "Optimisation-based strategy for shunt active power filter control under non-ideal supply voltages," in *IEE Proceedings - Electric Power Applications*, vol. 152, no. 2, pp. 182-190, 4 March 2005.

doi: 10.1049/ip-epa:20045017

Abstract: A new theory and a conceptual design for the three-phase shunt active power filter (APF) control strategy under imbalanced and distorted supply voltages are presented. Conventionally, the compensation currents injected by the APF are determined according to reference frame transformation-based approaches, where the load instantaneous real and reactive powers are calculated in the new reference frame. The APF injection currents are then computed to maintain the balanced and sinusoidal source currents, as well as the least active power consumption by the APF. However, if current harmonics set by harmonic standards or other constraints are considered, the load harmonic currents after APF compensation can be controlled to meet the requirements. Therefore, the APF may have an adjustable performance. An optimal algorithm for the APF control in steady state is proposed, in which the individual and total harmonic current distortion limits, the minimum load power factor, levels of current imbalance and the size of the APF can be taken into account. The planned APF does not consume or produce active power and only the passive energy-storage elements are required in the new APF design. Results obtained by simulations with Matlab and Simulink show that the proposed approach is more flexible than conventional approaches for compensating reactive power and harmonic/neutral currents of the load, even if the source voltages are severely distorted and imbalanced. The new control strategy is very suitable for planning the APF when several alternative objective functions and constraints are under considerations.

keywords: {active filters;mathematics computing;power engineering computing;power harmonic filters;reactive power control;Matlab;Simulink;distorted supply voltages;harmonic currents;imbalanced supply voltages;passive energy-storage elements;reactive power compensation;three phase shunt active power filter control},

URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1425274&isnumber=30771>

C. Hamrouni, A. Bsis, R. Hamza and N. Abdelkarim, "A new MEM-DOA proposal for DSM in a grid connected smart microgrid," *2017 Progress In Electromagnetics Research Symposium - Spring (PIERS)*, St Petersburg, Russia, 2017, pp. 1782-1786.

doi: 10.1109/PIERS.2017.8262039

Abstract: In the paper, we propose a new solution based on a MEM-DOA that means a Microgrid Energy Management-Distributed Optimisation Algorithm used for DSM in a grid-connected smart microgrid with heterogeneous (passive and active) types of residential consumers. The arbitrage opportunities that exist in smart microgrid offer benefits to centralised microgrid energy storage owner/provider, and active consumers with DES and DEG. We propose Smart Microgrid Energy Management (SMEM) architecture to demonstrate that future grid will become a balanced grid with new table aggregate load profile.

keywords: {Aggregates;Electromagnetics;Energy consumption;Energy management;Microgrids;Smart grids;Springs},

URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8262039&isnumber=8261694>

S. Aouad and D. El Ganami, "Advanced passive clustering," *2012 International Conference on Multimedia Computing and Systems*, Tangier, 2012, pp. 468-472.

doi: 10.1109/ICMCS.2012.6320150

Abstract: A wireless sensor network (WSN) is a set of nodes communicating through wireless links to observe a given phenomenon. Once sensors are deployed they are considered autonomous. Their lifetime is limited by the lifetime of their batteries. Currently the mobility of sensor nodes poses the new challenges. Given the constraints of mobility and energy consumption, WSNs require the implementation of new algorithms. In this paper, we propose a new protocol designated for mobile nodes in wireless sensor network that is based on the passive clustering. This mechanism does not use any protocol control packet or signals, does not require reconstruction of the cluster topology after each depart of CH, reduces overhead and preserve energy. It allows balanced energy consumption by the network nodes and maintains the cluster architecture for long-term. Simulation results show significant performance improvements when this new protocol is used.

keywords: {energy consumption;mobility management (mobile radio);pattern clustering;protocols;radio links;sensor placement;wireless sensor networks;WSN;advanced passive clustering;balanced energy consumption;mobile node;network lifetime;network node;protocol;sensor deployment;wireless link;wireless sensor network;Algorithm design and analysis;Clustering algorithms;Logic gates;Mobile communication;Protocols;Wireless communication;Wireless sensor networks;active clustering;mobility;passive clustering;self-organization;wireless sensor network},

URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6320150&isnumber=6320104>

N. A. Greatrex*, D. L. Timms, N. Kurita, E. W. Palmer and T. Masuzawa, "Axial Magnetic Bearing Development for the BiVACOR Rotary BiVAD/TAH," in *IEEE Transactions on Biomedical Engineering*, vol. 57, no. 3, pp. 714-721, March 2010.

doi: 10.1109/TBME.2009.2033389

Abstract: A suspension system for the BiVACOR biventricular assist device (BiVAD) has been developed and tested. The device features two semi-open centrifugal impellers mounted on a common rotating hub. Flow balancing is achieved through the movement of the rotor in the axial direction. The rotor is suspended in the pump casings by an active magnetic suspension system in the axial direction and a passive hydrodynamic bearing in the radial direction. This paper investigates the axial movement capacity of the magnetic bearing system and the power consumption at various operating points. The force capacity of the passive hydrodynamic bearing is investigated using a viscous glycerol solution. Axial rotor movement in the range of ± 0.15 mm is confirmed and power consumption is under 15.5 W. The journal bearing is shown to stabilize the rotor in the radial direction at the required operating speed. Magnetic levitation is a viable suspension technique for the impeller of an artificial heart to improve device lifetime and reduce blood damage.

keywords: {artificial organs;biomagnetism;blood;haemodynamics;machine bearings;magnetic levitation;rotors;suspensions (mechanical components);BiVACOR rotary;artificial heart impeller;axial movement capacity;blood damage;hydrodynamic bearing;magnetic bearing system;magnetic levitation;suspension technique;viscous glycerol solution;Artificial heart;Australia;Biological systems;Blood;Energy consumption;Hydrodynamics;Impellers;Magnetic levitation;System testing;Technological innovation;Artificial biological organs;blood pumps;electromagnetic forces;magnetic levitation;0},

URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5282636&isnumber=5419290>

Y. Yang and R. S. Blum, "Energy-efficient Routing for Signal Detection under the Neyman-Pearson Criterion in Wireless Sensor Networks," *2007 6th International Symposium on Information Processing in Sensor Networks*, Cambridge, MA, 2007, pp. 303-312.

doi: 10.1109/IPSNS.2007.4379690

Abstract: Energy-efficient routing for wireless sensor networks (WSNs) has been a topic of great interest for the last few years, but thus far routing for signal detection in WSNs has not attracted much attention. In particular, little research has focused on the Neyman-Pearson criterion which is the most well accepted metric for radar, sonar and related signal detection problems. In this paper, we formulate the problem of energy-efficient routing for signal detection under the Neyman-Pearson criterion, apparently for the first time. We hereby propose two different routing metrics that aim at a tradeoff between the detection performance and the energy consumption. In particular, the first one leads to a combinatorial problem of identifying a path which achieves the largest possible mean detection-probability-to-energy ratio, while the second one reduces to finding a route which minimizes the consumed energy while maintaining a predetermined detection probability. We further provide efficient algorithms for solving these problems based on state-of-the-art research from operations research. We also present simulation results which indicate the distinctive energy-performance balance achieved by each proposed routing metric.

keywords: {probability;signal detection;telecommunication network routing;wireless sensor networks;Neyman Pearson criterion;energy efficient routing;mean detection probability to energy ratio;routing metric;signal detection;wireless sensor networks;Costs;Energy consumption;Energy efficiency;Radar detection;Routing;Signal detection;Signal processing algorithms;Sonar detection;Sonar measurements;Wireless sensor networks;Algorithms;Design;Neyman-Pearson criterion;Performance;Wireless sensor networks;active sensing;combinatorial optimization;energy efficiency;in-network processing;passive sensing;routing;signal detection},

URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4379690&isnumber=4379652>