

Abstract Sheet (Bibliographical Entries)

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Lambropoulou, V., Karageorgopoulos, A., Kornaros, M., Tsoutsos, T.

Περιβαλλοντικές Επιπτώσεις από Μικρούς Υδροηλεκτρικούς Σταθμούς – Η Ελληνική Εμπειρία (Environmental Impacts of Small Hydropower Plants (SHPs) - The Greek Experience)

Tech. Chron. Sci J.T.C.G., ΙΙΙ, Jan.-Dec. 2004, vol. 24, no 1-2, pp. 9-24, diagr., tab., pl., 29 ref

Small hydropower plants (SHPs) are one of the most widespread applications for the exploitation of renewable energy sources (RES) in Greece. They present important environmental advantages concerning the production of electric energy in comparison with the exploitation of conventional energy sources (such as lignite, fuel oil etc). However, there are some cases where organizations or the local community object to the construction of SHPs, because of the potential negative environmental impacts they might have.

The aim of this work is to review the environmental impacts from the construction and operation of SHPs, as reported in the scientific and technical bibliography and recognized in more detail from the Greek experience, in an effort to assist both engineers and the public to form a clear view of the environmental aspects which currently restrict the development of SHPs. Prevention, minimization and rehabilitation measures are then proposed to cope with the environmental impacts identified, based on new technologies and best practices. A lack is also documented as regards the identification, reporting and suggestion of appropriate measures for all the sensitive environmental parameters which are identified in Environmental Impacts Assessment (EIA) studies conducted for Greek SHPs. Moreover, weaknesses are recognized in the respective national legislation governing the construction and operation of SHPs.

(Authors)

K-W: Small Hydroelectric Plants, Environmental Impacts

Rikos, E., Tatakis, E., (Univ. of Patras, Fac. of Technology, Dept. of Electrical and Computer Eng., Patras)

Ελαχιστοποίηση των Απωλειών του Κινητήριου Συστήματος ενός Ηλεκτρικού Οχήματος (Loss Minimization of the Electromechanical System of an EV)

Tech. Chron. Sci J.T.C.G., ΙΙΙ, Jan.-Dec. 2004, vol. 24, no 1-2, pp. 25-40, tab., fig., 21 ref

This paper investigates the optimal operation of an electromechanical system of an EV, consisting of a separately excited DC motor which is controlled by a DC/DC converter. More analytically, a method for total loss minimization is proposed. This method is based on the selection of optimal values for the motor flux and the gear box ratio for an operation point. The optimal values of the above two parameters are deduced from an analytical loss model by using an iteration method. The latter is performed for different values of the speed and the force on the wheels. The optimal values derived for the flux and the gear-box ratio are used in order to form

an analytical formula which can be used in the control system of the vehicle. The simulation results of the proposed method validate the theoretical analysis, while proving that a significant amount of energy can be saved with the proper control of the aforementioned parameters, leading to a greater autonomy.

(Authors)

K-W: Electric Drives, Electric Vehicles, DC Motors, Mechanical Losses, Loss Minimization, Efficiency Optimization.

Georgilakis, P. S. A., (Technical Univ. of Ctete, Dept of Production Engineering and Management)

Εφαρμογή Γενετικών Αλγορίθμων στην Παραγωγή Ηλεκτρικής Ενέργειας (Application of Genetic Algorithms to the Production of Electrical Energy)

Tech. Chron. Sci J.T.C.G., ΙΙΙ, Jan.-Dec. 2004, vol. 24, no 1-2, pp. 41-50, tab., fig., 24 ref

Genetic algorithms are optimization techniques based on the concepts of natural selection and genetics. This paper gives a brief introduction to genetic algorithms and their applications to power systems and analytically presents the application of genetic algorithms to the production of electrical energy and more specifically to the solution of the economic dispatch problem

(Author)

K-W: Genetic algorithms, system optimization

Vlachogiannis, J. G, Hatziaargyriou, N. D. (N.T.U.A., Sch. of Electrical and Computer Engineer, Zografou-Athens)

Βέλτιστη Τοπολογία Δικτύων Διανομής Ηλεκτρικής Ενέργειας με Εφαρμογή της Ενισχυτικής Μηχανικής Μάθησης (Optimal Reconfiguration of Radial Distribution System using Machine Reinforcement Learning)

Tech. Chron. Sci J.T.C.G., ΙΙΙ, Jan.-Dec. 2004, vol. 24, no 1-2, pp. 51-57, tab., fig., 10 ref

This paper presents a Reinforcement Learning (RL) method for optimal reconfiguration of a radial distribution system (RDS). Optimal reconfiguration involves selection of the best set of branches to be opened, one from each loop, such that the resulting RDS has the desired performance. Among the several performance criteria considered for optimal network reconfiguration, an important one is the minimization of real power losses while satisfying voltage limits. The RL method formulates the reconfiguration of RDS as a multistage decision problem. More specifically, the model-free learning algorithm (Q-learning) learns by experience how to adjust a closed-loop control rule, mapping operating states to control actions by means of reward values. Rewards are chosen to express how well control actions cause minimization of power losses. The Q-learning algorithm was applied to the reconfiguration of a 33-bus RDS busbar system. The results are compared with those given by other evolutionary programming methods

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| K-W: Power network topology, topology optimizatio | (Authors) | ητικής Μηχανής – Ανάλυση Στατικής και Δυναμικής Συμπεριφοράς
(Load Distribution Control of a Paper Machine's Multi-motor
Drive System – Steady State and Dynamic Behavior Analysis) |
| Papadogiannis, K. A., Hatziaargyriou, N. D., (N.T.U.A., Sch. of
Electrical and Computer Engineer, Zografou-Athens) | Tech. Chron. Sci J.T.C.G., ΙΙΙ, Jan.-Dec. 2004, vol. 24, no 1-2, pp.
73-87, fig., 19 ref | |
| <i>Μέθοδος Βέλτιστης Κατανομής Υπηρεσιών Πρωτεύουσας Εφεδρείας
σε Περιβάλλον Ελεύθερης Αγοράς (Optimal Allocation of Primary
Reserve Services in Energy Markets)</i> | <i>A control method for the operation of a multi-motor drive system
of paper machines is proposed in the present study. Paper machine
drive systems, as a rule, consist of D.C. motors, which are fed
by three-phase electronic power converters. In the present case
study four D.C. motors drive two presses and a drying cylinder.
Furthermore, an automatic control method is proposed, through
which the rational mechanical load distribution of the motors
is controlled, depending on their nominal power. According to
the requirements of the paper machine, two phases of operation
are distinguished. In the first phase two D.C. motors drive two
presses, not in contact with the drying cylinder. The other two
D.C. motors drive the drying cylinder. When the two sections are
synchronized, the second phase starts. The two sections come in
contact and are rotating absolutely with the same linear speed.
Then the paper comes in contact with the hot drying cylinder and
it dries. Subsequently, it is wound on a cylinder for final use. In
this industrial process there is a combination of rotational and
linear movement for the formation and drying of the paper. The
proposed method aims at the precise control of the kinetic behavior
of the two sections, coordinating the operation of the presses and
the drying cylinder. Because of the structure of the system there
are inevitable transient conditions. For this reason, in the present
work the investigation is focused on both the static and the dynamic
behavior of the system.</i> | |
| Tech. Chron. Sci J.T.C.G., ΙΙΙ, Jan.-Dec. 2004, vol. 24, no 1-2, pp.
59-72, tab., fig., 29 ref | (Authors) | K-W: Multi-motor Drive System, Control of Load Distribution,
Dynamic Performance, Electric Drive Systems. |
| <i>This paper presents a novel economic dispatch algorithm that
simultaneously minimizes the cost of primary reserve services
while ensuring the secure operation of the power system in the
presence of disturbances. The algorithm takes account of security
constraints, which are extracted from the chain rules provided by
decision trees. The proposed method is easy to implement in day-
ahead and real-time balancing markets and is characterized by
accuracy, versatility and flexibility. Examples demonstrating the
application of the method to an actual power system model are
presented and discussed.</i> | (Authors) | |
| K-W: Security, Reliability, Backup Power Distribution System,
Allocation of Ancillary Services, Decision Trees, Deregulation of
Electric Market. | | |
| Michael, C., Safacas, A., (Univ. of Patras, Fac. of Technology,
Dept. of Electrical and Computer Eng., Patras) | (Authors) | |
| <i>Έλεγχος Κατανομής Φορτίου σε Πολυκινητήριο Σύστημα Χαρτοποι-</i> | | |