Trends in energy conversion and renewable energy sources

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1. **Djamel Ikni, Elena Răducan -** *Technical economic analysis for energy sustainable micro grid in the rural area. Case study*

   Abstract

   The paper presents the technical-economic study of the renewable energy production system for rural communities in Romania. The case study cover data with electricity consumption demand and economical aspects of the inhabitants of a small village name Barcea. The proposed solution aim to reduce CO_2 production resulted from fossil fuel mostly used from wood heaters during winter and for cooking. Renewable energy solution as solar and wind power were simulated associated with storage systems, using Matlab software. The economic module for economical approach is a simple one based on energy prices nowadays in Romania and few tenderers of small solution for individual renewable sources (as solar panels).

2. **Romeo Păduraru, Cristinel Crăciun, Traian Munteanu, Adriana Burlibaşa -** *EMC aspects in power conversion systems*

   Abstract

   Given the massive movement towards hybrid power sources and electrification in the marine industry, power conversion systems are increasingly needed to support the flexibility and efficiency required of shipboard electrical grid. Electromagnetic compatibility has been considered as a matter of concern for special ships and for navy designs. The increase in the volume of power electronics systems relative to the installed power onboard the ship brings EMC compliance as a key factor for the good operation of the electrical installation. This paper addresses some EMC aspects that need to be considered in the design and installation of electrical systems incorporating power electronics equipment. Examples are used to highlight some of the solutions used to limit the electromagnetic interference that may occur during the operation of this equipment.

3. **Ion Voncilă, Elena Selim, Ion Paraschiv, Mădălin Costin -** *Thermal regime of induction motors after rewinding for other characteristics than those established by design.*

   Abstract

   The paper presents the changes in the thermal regime of rewound induction motors to obtain other functional characteristics than those established, initially, through the design process. Through the distribution of temperatures within the structure of the induction motor - distribution obtained with the help of the Motor-CAD programming environment - it is highlighted that, under the conditions of compliance with the claimed requirements for maintaining both the strength of the magnetic field (and, implicitly, the forces developed by the induction motor) as well as the current density, when rewinding to obtain other functional characteristics on a given physical structure/geometry of the short-circuited rotor motor, the thermal regime is different from the reference version, something that can radically influence the duration of his life.

4. **Adriana Burlibaşa, Romeo Păduraru, Traian Munteanu, Cristinel Dache, Teodor Dumitriu -** *PV simulator packaged as a standalone application into docker containers.*

   Abstract

With the new Matlab® Compiler any application can be packaged as a standalone application and deployed as docker container. The target system running a standalone application requires a MATLAB® Runtime installation to run the application. It does not require a licensed copy of MATLAB. Therefore, a minimum requirement must be met: linux environment and active docker service. The developed standalone application is a PV simulator.

5. **Tidjani Naoual, Ikni Samir, Ounnas Djamel, Guiza Dhaouadi, Guessoum Abderrezak - A** *hybrid TLBO and simplex algorithm to extract the optimal parameters of photovoltaic models.*

Abstract

Parameters extraction of solar models is a process of building a high-performance photovoltaic (PV) system. A hybrid of Teaching Learning Based optimization (TLBO) with simplex algorithm is proposed in this work to determine the unknow electrical parameters of single and dual diode models. The main objective is to extract the optimal parameters of the PV system. In order to avoid falling into a local optimum, deterministic algorithm is used in the proposed hybrid method where the simplex algorithm improves the individual search capabilities by performing the local search phase and hasten a faster convergence to the optimal parameters. Compared with some algorithms that have a competitive performance in dealing with this kind of problem such as Particle Swarm Optimization (PSO) and Genetic Algorithm (GA), the proposed hybrid algorithm, the results obtained from the proposed approach demonstrated the robust performance of the developed hybrid method, which was superior to other optimization methods in the accuracy of the objective function. Furthermore, the exceptional agreement between the data of a commercial silicon R.T.C. France solar cell and the simulation results under all conditions confirms the effectiveness of the obtained results.