A REVIEW OF ENSEMBLE METHODS FOR DE NOVO MOTIF DISCOVERY IN CHIP-SEQ DATA

Andrei LIHU, Ştefan HOLBAN

Short description of the journal

Briefings in Bioinformatics is a highly prestigious international journal published by Oxford University Press. According to Journal Citation Reports 2014, with an impact factor of 9.617, the journal is ranked second in the world in the subject category of "Mathematical & Computational Biology" and third in "Biochemical Research Methods".

Abstract

De novo motif discovery is a difficult computational task. Historically, dedicated algorithms always reported a high percentage of false positives. Their performance did not improve considerably even after they adapted to handle large amounts of chromatin immunoprecipitation sequencing (ChIP-Seq) data. Several studies have advocated aggregating complementary algorithms, combining their predictions to increase the accuracy of the results. This led to the development of ensemble methods. To form a better view on modern ensembles, we review all compound tools designed for ChIP-Seq. After a brief introduction to basic algorithms and early ensembles, we describe the most recent tools. We highlight their limitations and strengths by presenting their architecture, the input options and their output. To provide guidance for next-generation sequencing practitioners, we observe the differences and similarities between them. Last but not least, we identify and recommend several features to be implemented by any novel ensemble algorithm

Key words

Next-generation sequencing, motif discovery, ensemble methods, ChIP-Seq, transcription factors

The authors
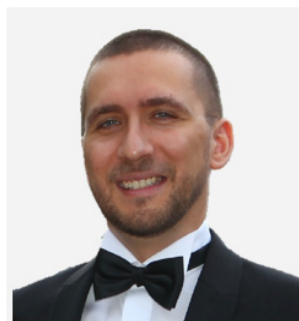
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GENERAL REVIEW OF SOLAR-POWERED CLOSED SORPTION REFRIGERATION SYSTEMS

Short description of the journal

This paper was published in November 2015 by the reputable journal Energy Conversion and Management, ISSN 0196-8904, a high-impact international journal.

This journal published by Elsevier provides a forum for publishing original contributions and comprehensive technical review articles of interdisciplinary and original research on all important energy topics. The topics considered include energy generation, utilization, conversion, storage, transmission, conservation, management and sustainability. These topics typically involve various types of energy such as mechanical, thermal, nuclear, chemical, electromagnetic, magnetic and electric. These energy types cover all known energy resources, including renewable resources (e.g. solar, bio, hydro, wind, geothermal and ocean energy), fossil fuels and nuclear resources. According to ISI Journal Citation Reports 2014, this journal has an impact factor IF=4,380.

Abstract

This paper provides a detailed review of the solar closed sorption (absorption and adsorption) refrigeration systems, which utilise working pairs (fluids). After an introduction of the basic principles of these systems, the history of development and recent advances in solar sorption refrigeration technologies are reported. The adsorption cooling typically has a lower heat source temperature requirement than the absorption cooling. Based on the coefficient of performance (COP), the absorption systems are preferred over the adsorption systems, and the higher temperature issues can be easily handled with solar adsorption systems. The thermodynamic properties of most common working fluids, as well as the use of ternary mixtures in solar-powered absorption systems, have been reviewed in this study. The paper also refers to new approaches to increase the efficiency and sustainability of the basic adsorption cycles, such as the development of hybrid or thermal energy storage adsorption systems.

This research shows that solar-powered closed sorption refrigeration technologies can be attractive alternatives not only to serve the needs for air-conditioning, refrigeration, ice making, thermal energy storage or hybrid heating and cooling purposes but also to meet the demands for energy conservation and environmental protection.

Key words

Solar energy, Refrigeration, Sorption system, Absorption, Adsorption, Energy efficiency

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Research Report 2015

EXPERIMENTAL AND NUMERICAL RESEARCH TO ASSESS INDOOR ENVIRONMENT QUALITY AND SCHOOLWORK PERFORMANCE IN UNIVERSITY CLASSROOMS

Ioan SÂRBU, Cristian PACURAR

Short description of the journal

This paper was published in November 2015 by the reputable journal Building and Environment, ISSN 0360-1323, a high-impact international journal.

This journal published by Elsevier is an international journal that publishes original research papers and review articles related to building science and human interaction with the built environment. The journal invites research articles conveying robust, tested knowledge on thermal, acoustic, visual, air quality building science and human impacts. The journal is focused on new knowledge, rigorously verified with measurement and analysis, related to the environmental performance of buildings in different scales, ranging from cities, communities, buildings, to building systems and assemblies.

- Up to now, this paper is already cited by an article published in the literature, according to the journal web site.

Abstract

The primary aim of this study is to assess thermal comfort based on the predicted mean vote (PMV) and predicted percent dissatisfied (PPD) indices using subjective and experimental measurements in two air conditioned classrooms at a university, where the air-exchange rate is assured by natural ventilation. The indoor environmental conditions were satisfactory, and all situations fit within the comfort limits. The mean value of the PMV index ranges from 0.55 to -0.69 during both seasons, and the mean value of the PPD index ranges from 11.66 to 15.04%.The influence of the air conditioning system and ventilation provided by manually operated windows during the cooling season on thermal comfort parameters and CO_2 concentration are also investigated by in situ measurements. In the absence of a cooling system and the ventilation rates, the air temperature exceeds the maximum comfort limit of 27^0C. Additionally, the PMV and PPD indices have the values of 0.87 and 21%, respectively and the CO_2 concentration increases above the admissible limit, reaching a value of 2400 ppm. By manually opening the windows, the CO_2 concentration decreases significantly to 1500 ppm. Thermal comfort is notably improved (PMV=-0.34, PPD=7.4%) when the cooling system is running in the room. The secondary aim of this paper is to develop a prediction model of the academic performance during the cooling season.

Application of this model indicates that the indoor environmental conditions can strongly affect student performance. Finally, a simulation model on the Transient System Simulation (TRNSYS) program of the PMV-PPD indices and heating/cooling energy demand for an amphitheatre with natural ventilation is proposed.

Key words

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NUMERICAL AND EXPERIMENTAL INVESTIGATION ON SEISMICALLY DAMAGED REINFORCED CONCRETE WALL PANELS RETROFITTED WITH FRP COMPOSITES

Carla TODUT, Daniel DAN, Valeriu STOIAN

Short description of the journal

This paper was published in September 2014, as electronic version, by the reputable journal Composite Structures, a high-impact international journal.
This journal publishes papers which contribute to knowledge in the use of composite materials in engineering structures. Papers deal with design, research and development studies, experimental investigations, theoretical analysis and fabrication techniques relevant to the application of composites in load-bearing components for assemblies, ranging from individual components such as plates and shells to complete composite structures.
According to ISI Journal Citation Reports 2014, this journal has an impact factor IF=3,318.

Abstract

This paper presents the results of an experimental program on precast reinforced concrete wall panels (PRCWP). These panels were damaged under cyclic lateral loads and thereafter retrofitted or rehabilitated and retested. The experimental program was conceived to analyse the possibilities of using FRP materials for strengthening the PRCWP affected by seismic action. The fibre reinforced polymer (FRP) composites are frequently used in strengthening structural elements because of their superior characteristics and simple technology. The existing literature lacks information concerning reinforced concrete walls (RC) retrofitted by FRP composites compared to other structural members. This paper presents various effective strengthening solutions that can be applied to damaged elements. The retrofitting solutions consist in use of EBR-CFRP strips, combined EBR-CFRP strips with NSM-
CFRP plates, textile reinforced mortar (TRM) using glass fibre grid, and TRM using carbon fibre grid. The solutions were proposed with the aim of restoring the wall shear resistance and to provide the confinement effect at the ends. The experimental results indicate that the performance of the elements, repaired and strengthened, were almost equal to or higher than the reference elements in terms of load bearing capacity, stiffness and energy dissipation capacity.

A more ductile behaviour compared to the reference elements was recorded for the rehabilitated and retrofitted elements..

Key words

Seismic performance, Strengthened RC walls, EBR-CFRP, Experimental tests.

- Up to now, this paper is already cited by an article published in the literature, according to the journal web site.

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Research Report

AN ANALYTICAL APPROACH TO NON-LINEAR DYNAMICAL MODEL OF A PERMANENT MAGNET SYNCHRONOUS GENERATOR

Nicolae HERISANU, Vasile MARINCA, Gheorghe MADESCU

Short description of the journal

This paper was published in September 2015 by the reputable journal Wind Energy, online ISSN 1099-1824, a high-impact international journal.

According to the on-line version of this journal published by Willey, Wind Energy offers a major forum for the reporting of advances in this rapid developing technology with the goal of realising the world-wide potential to harness clean energy from land-based and offshore wind. This journal aims to reach all those with an interest in this field from academic research, industrial development through applications, including individual wind turbines and components, wind farms and integration of wind power plants. The journal covers the entire spectrum of scientific and engineering disciplines concerned with the advancement of wind power capture, conversion, integration, and utilization technologies.

According to ISI Journal Citation Reports 2014, this journal has an impact factor IF=3,069, so that it's ranking 2014 is 5 / 130 in the category "Engineering. Mechanical".

Abstract

This paper proposes an analytical approach to investigate the transitory dynamic regime of a low-power permanent magnet synchronous generator that works in an actual wind power station. The governing non-linear differential equations are solved by means of the optimal homotopy asymptotic method, and explicit analytical solutions are obtained. Four cases are analysed for different moments of inertia and electrical resistances specific to sudden short circuit produced at the generator terminals and sudden change of load. The proposed procedure is highly efficient and controls the convergence of the approximate solutions, ensuring a very fast convergence.

Such analytical approach allows modeling and simulating turbine generator systems for real-time computations, offline applications or stability problems. Numerical investigations are also performed in order to validate the analytical results

Key words

Permanent magnet synchronous generator; transitory regime; optimal homotopy asymptotic method

- Up to now, this paper is already cited by four articles published in the literature, according to the journal web site.

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