บทความที่น่าสนใจประจำเดือนมิถุนายน 2558
สาขาวิทยาศาสตร์และเทคโนโลยี

1	Title:	Two-Stage Solar Photovoltaic-Based Stand-Alone Scheme Having Battery as Energy Storage Element for Rural Deployment
	Author:	Debnath, D. ; Chatterjee, K.
	Journal:	IEEE Transactions on Industrial Electronics, Volume:62 Issue:7, July 2015, Pages 4148 - 4157
	Abstract:	Solar photovoltaic (PV)-based stand-alone systems have evolved as a promising solution to the issue of electrification in areas where the grid is not available. The major challenges in designing such systems are as follows: 1) extraction of maximum power from the PV array; 2) protection of the battery from overcharge and overdischarge; 3) dc to ac conversion; and 4) provision for adequate voltage boosting. As multiple objectives are required to be satisfied, the existing schemes for stand-alone systems require a minimum of three converter stages, leading to considerable reduction in the reliability and efficiency of the system. In order to address this issue, a two-stage stand-alone scheme consisting of a novel transformer-coupled dual-input converter (TCDIC) followed by a conventional full-bridge inverter is proposed in this paper. The proposed TCDIC can realize maximum power point tracking and battery charge control while maintaining the proper voltage level at the load terminal. The small signal mathematical model of the TCDIC is derived. A suitable control strategy for the proposed TCDIC is devised. The operation of the scheme is verified by performing detailed simulation studies. A laboratory prototype of the scheme is developed. Detailed experimental validation of the scheme utilizing the laboratory prototype is carried out to confirm the viability of the scheme.
	Database:	IEEE/IET Electronic Library (IEL)

2	Title:	Model Predictive Direct Power Control of PWM Rectifiers Under Unbalanced Network Conditions
	Author:	Zhang, Y. ; Qu, C.
	Journal:	IEEE Transactions on Industrial Electronics, Volume:62 Issue:7, July 2015, Pages 4011 - 4022
	Abstract:	Model predictive direct power control (MPDPC) has been proposed as an effective alternative to conventional direct power control for pulsewidth-modulation (PWM) rectifiers. However, the sampling frequency of MPDPC still has to be high to achieve satisfactory performance. Furthermore, the grid currents of MPDPC would become highly distorted under unbalanced network conditions. To cope with the problems above, this paper proposes an improved MPDPC for PWM rectifiers, which is able to operate under both balanced and unbalanced grid voltages. By using a new definition of instantaneous reactive power in the predefined cost function, the proposed MPDPC can obtain sinusoidal grid currents and eliminate twice grid-frequency oscillation in both active power and the new reactive power. Neither complicated positive/negative-sequence extraction of grid voltage/current

		nor power compensation is required. Depending on the desired performance, two variants of the improved MPDPC are proposed and comparatively studied. At the same sampling frequency, the first approach achieves relatively low switching frequency, whereas the second approach obtains lower power ripples. Both simulation and experimental results are presented to confirm the effectiveness of the proposed methods.
	Database:	IEEE/IET Electronic Library (IEL)

3	Title:	Adaptive Rate-Limit Control for Energy Storage Systems
	Author:	Wu, D. ; Todd, R. ; Forsyth, A.J.
	Journal:	IEEE Transactions on Industrial Electronics, Volume:62 Issue:7, July 2015, Pages 4231 - 4240
	Abstract:	An adaptive energy management control with an integrated variable rate-limit function is described for an energy storage system (ESS). The proposed control protects the primary power source(s) in the system as effectively as possible from sudden load transients within the constraints of the available stored energy. The control can be designed to use the available energy more aggressively during load changes in the low- or high-power regions while offering the lowest possible rate-of-change of the main source power or offers a fixed minimum rate-of-change in power for a given total load and amount of energy. The control design is described in detail and demonstrated experimentally when applied to a supercapacitor ESS within an aircraft test facility.
	Database:	IEEE/IET Electronic Library (IEL)

4	Title:	Colorimetric detection of cholesterol based on highly efficient peroxidase mimetic activity of graphene quantum dots
	Author:	Narsingh R. Nirala, Shiju Abraham, Vinod Kumar, Anushka Bansal, Anchal Srivastava, Preeti S. Saxena
	Journal:	Sensors and Actuators B: Chemical, Volume 218, 31 October 2015, Pages 42–50
	Abstract:	In the present study, we report graphene quantum dots (GQDs), an enzyme mimetic of horse radish peroxidase (HRP), for unprecedented detection of free cholesterol. Synthesized directly from graphite using simple and quick one step wet chemical method, these GQDs in the presence of H2O2 exhibit highly efficient catalytic activity toward the oxidation of peroxidase substrate 3,3,5,5-tetramethylbenzidine (TMB) to produce a blue colored product. The proposed detection system based on GQDs allows wide range (0.02–0.6 mM) of cholesterol sensing with a detection limit as low as 0.006 mM. Further, higher Vmax (7.3 × 10−6 M s−1) along with lower Km (0.01 mM) attest enhanced peroxidase like catalytic activity and better binding affinity of cholesterol oxidase (ChOx) to cholesterol resulting in good biosensor stability and resistance to environmental interferences. The proposed method without the use of sophisticated instruments perceives the cholesterol using naked eye with blue color compound formation. The potential of the method to be applied on field is shown by the

	proposed cholesterol measuring color wheel, where the shades of color are related to actual levels of cholesterol in the sample.
Database:	ScienceDirect

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Title:	Monitoring the quality of raw poultry by detecting hydrogen sulfide with printed sensors
Author:	J. Koskela, J. Sarfraz, P. Ihalainen, A. Määttänen, P. Pulkkinen, H. Tenhu, T. Nieminen, A. Kilpelä, J. Peltonen
Journal:	Sensors and Actuators B: Chemical, Volume 218, 31 October 2015, Pages 89-96
Abstract:	Food quality and safety are controlled by legislation and monitored both by food industry players and regional and national authorities in a food supply chain. The need for more precise estimation of shelf life and faster results from food pathogen tests has resulted in the development of novel food quality sensors. Intelligent food packages are the concept toward traceability and real time monitoring of food. Herein we present the usage of printed and low-cost copper acetate-based sensors for monitoring the quality of raw broiler meat. The sensor operates by detecting hydrogen sulfide (H2S) as an end product of the microbial metabolism. The sensors responded to H2S at +6 °C accumulated in modified atmosphere, packaged broiler meat. A concept of the sensor platform, in which the sensor is combined with a printed planar coil antenna and printed capacitor to construct a wirelessly readable printed resonance circuit, is also presented. The sensor is suitable for large-scale production, which could make it inexpensive enough to be integrated in a low-cost retail food package.
Database:	ScienceDirect

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Title:	Rapid sensing of hepatitis B virus using QCM in the thickness shear mode
Author:	Fedor N. Dultsev, Andrei V. Tronin
Journal:	Sensors and Actuators B: Chemical, Volume 216, September 2015, Pages 1–5
Abstract:	It is shown that sensor for hepatitis can be manufactured using a thickness shear mode resonator. Not the added mass is measured but the moment of particle (virus) detachment from the QCM surface is detected, which explains the high sensitivity of this sensor. The sensor allows confident determination of the presence of 140–150 viruses, while a typical signal shape is an additional warranty of selectivity confirming that it is hepatitis B virus (HBV) that was fixed on the surface. This method can be the ground for a prototype of the sensor for rapid analysis based on affine interactions.
Database:	ScienceDirect

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Title:	Vibration-based damage precise localization in three-dimensional structures: Single versus multiple response measurements
Author:	Christos S Sakaris, John S Sakellariou, and Spilios D Fassois

Journal:	Structural Health Monitoring, May 2015 vol. 14 no. 3 300-314
Abstract:	The goal of this study is vibration-based damage precise localization on three-dimensional structures through the vector version of an advanced Functional Model–Based Method. This version, which constitutes an extension of the original scalar method, is equipped with a Functional Model form that may simultaneously exploit multiple structural responses and incorporate the damage coordinates within its parameters through an appropriate operating parameter vector. Based on this model form, precise estimation of the damage coordinates is achieved within a nonlinear optimization framework with constraints representing the three-dimensional structural topology, and corresponding damage confidence intervals are constructed. The effectiveness of the method is assessed through damage precise localization for numerous damage scenarios in a three-dimensional truss structure, as well as through detailed comparisons with the previous, scalar method, demonstrating significant reduction in the localization error.
Database:	Sage Journals Online

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Title:	Impedance-based fault detection methodology for rotating machines
Author:	Aldemir Ap Cavalini, Jr, Roberto Mendes Finzi Neto, and Valder Steffen, Jr
Journal:	Structural Health Monitoring, May 2015 vol. 14 no. 3 228-240
Abstract:	Visual examination, ultrasonic tests, and dye penetrant inspection are some examples of nondestructive techniques widely used for crack detection in rotors. These methods have proved to be costly, since satisfactory results rely on detailed and periodic inspections. Significant research effort has been directed in recent years to online monitoring techniques, that is, based on vibration signals measured during rotor operation. However, most of them are able to only detect deep cracks. The uniqueness of this article relies on the possibility of detection of incipient transverse cracks in rotating shafts using the so-called, electromechanical impedance method. This method has become a promising tool for structural health monitoring of systems due to its sensitivity to small local damage. Basically, the method monitors changes in the electric impedance of piezoelectric transducers, bonded to (or embedded into) the host structure, through specific mathematic functions, the so-called damage metrics, to detect damage. This is possible because the electrical impedance of the transducer is directly related to the mechanical impedance of the structure. In this context, successful experimental tests were performed in a horizontal rotor supported by roller bearings. Lead zirconate titanate (PZT) patches were bonded along the shaft of the rotor in which saw cuts approximating a breathing transverse crack were machined. The technique was validated under different rotating speeds and unbalance conditions.
Database:	Sage Journals Online

9	Title:	Analysis of Agroalimentary and Environmental Contaminants Using Flow-Through Chemical Optosensors
	Author:	E. J. Llorent-MartíNez, M. L. Fernández-de Córdova, P. Ortega-Barrales & A. Ruiz-Medina
	Journal:	Applied Spectroscopy Reviews, Volume 50, Issue 7, 2015, pages 527-556
	Abstract:	In this review, the different strategies developed for the analysis of pesticides, heavy metals, and other contaminants in the agroalimentary and environmental fields using chemical flow-through optical sensors is described. A brief description of the different flow methodologies used in optosensing is provided, and detailed descriptions of selected examples are explained, paying special attention to the strategies adopted by the different authors to improve sensitivity and selectivity, as well as the sample treatments used for the different reported applications. The future trends of these systems are also discussed.
	Database:	Taylor & Francis Journals

10	Title:	A Review of Application of Total Reflection X-ray Fluorescence Spectrometry to Water Analysis
	Author:	G. V. Pashkova & A. G. Revenko
	Journal:	Applied Spectroscopy Reviews, Volume 50, Issue 6, 2015, pages 443-472
	Abstract:	The aim of this article is to review the literature on the application of the total reflection X-ray fluorescence (TXRF) spectrometry for the determination of the chemical composition of aqueous samples. Details of the main stages of the analytical procedures are described. Special attention is given to the sample preparation procedure, current instrumentation, and potential error sources when analyzing the water samples of varying compositions. The examples of matrix effects and spectral interferences as well as the analytical figures of merit are also presented.
	Database:	Taylor & Francis Journals