N	اسم الباحث	Paper's title	Paper's Abstract
1)	Mokhles Abdulghani Kasim Al-Aubidy Mohammed Ali Qadri Hamarsheh	**Wheelchair Neuro Fuzzy Control and Tracking System Based on Voice Recognition**	Autonomous wheelchairs are important tools to enhance the mobility of people with disabilities. Advances in computer and wireless communication technologies have contributed to the provision of smart wheelchairs to suit the needs of the disabled person. This research paper presents the design and implementation of a voice-controlled electric wheelchair. This design is based on voice recognition algorithms to classify the required commands to drive the wheelchair. An adaptive neuro-fuzzy controller has been used to generate the required real-time control signals for actuating motors of the wheelchair. This controller depends on real data received from obstacle avoidance sensors and a voice recognition classifier. The wheelchair is considered as a node in a wireless sensor network in order to track the position of the wheelchair and for supervisory control. The simulated and running experiments demonstrate that, by combining the concepts of soft computing and mechatronics, the implemented wheelchair has become more sophisticated and gives people more mobility.
2)	Wagah Farman Mohammed Ali	**Technologies, Developments and Production of photovoltaic solar cells and photovoltaic power systems**	The various types of materials applied for photovoltaic solar cells includes mainly in the form of silicon (single crystal, multi-crystalline, amorphous silicon), cadmium-telluride, copper-indium-gallium-selenide, copper-indium-gallium-sulfide, Perovskite, dye sensitized, and organic are reviewed and characterized. The Performance of first generation solar cells (c-Si based) photovoltaic (PV) technology conversion efficiency lies in the range of 17 to 25% and predicts that the efficiency will reach a maximum of ~ 26.95 % by the year 2024. Multicrystalline silicon solar cell predicted to reach efficiency of 25%. price has been reduced by a factor of 250 over last twenty years (from ~ 76USD to ~ 0.3 USD); its market growth is expected to reach 100 GWP by 2020. In September 2017, the U.S. Department of Energy announced that the U.S. solar industry had achieved the 2020 utility-scale solar cost target of US $0.06/kWh. Thin film technology (second generation) has the cheaper cost, and can be considered as one of the promising technology for its attractive cost of energy. There are several semiconductor materials that are potential candidates for thin-film solar cells, namely: First: Hydrogenated amorphous silicon (a-Si:H) with best efficiency recorded was around 11%. Second: Cadmium telluride (CdTe), with the best efficiency of single cell recorded was 21% while CdTe based modules has been made the highest efficiency of 16.5%. Third: Copper indium gallium diselenide (CuInGaSe2=CIGS) paves the way for progress at the cell level (~ 25% efficiency), mini module (~ 21%) towards total area module efficiencies of 18%. There are several third generation concepts: Multi-junction solar cells, Concentrator photovoltaics, Spectral up and down conversion, Multi-exciton generation, Intermediate band-gap solar cells and Hot carrier solar cells. A maximum 38.8% efficiency is recorded for five junctions single cell, 11.2% for organic cell and around 10% for organic module. Over the last two decades, grid-connected solar photovoltaic (PV) systems have increased to one of the leading power generation capacity additions annually. In 2018, over 100 GW of new PV power capacity was added. Total installed PV power capacity was in excess of 500 GW at the end of 2018
3)	Ayman Agha Hani Attar Audih Alfaoury Mohammad Khosravi	**Maximizing Electrical Power Saving Using Capacitors Optimal Placement**	**Background:** Low power factor is regarded as one of the most dedicated issues in large-scale inductive power networks, because of the lost energy in term of a reactive power. Accordingly, installing capacitors in the network improves the power factor and hence decreases the reactive power. **Methods and Objectives:** This paper presents an approach to maximize the saving in terms of financial costs, energy resources, environmental protection, and to enhance the power system efficiency. Moreover, the proposed technique tends to avoid the

			penalties imposed over the electricity bill (in the case of the power factor drops below the permissible limit.), by applying a proposed method that consists of two stages: The first stage determines the optimal amount of compensating capacitors by using a suggested analytical method. The second stage employs a statistical approach to assess the reduction in energy losses resulting from the capacitors placement in each of the network nodes. Accordingly, the expected beneficiaries from improving the power factor are mainly large inductive networks such as large-scale factories and industrial field. A numerical example is explained in useful detail to show the effectiveness and simplicity of the proposed approach and how it works. **Results:** The proposed technique tends to minimize the energy losses resulted from the reactive power compensation, release the penalties imposed on electricity bills due to the low power factor. The numerical examples show that the saved cost resulted from improving the power factor, and energy loss reduction is around 10.94 % per month from the total electricity bill. **Conclusion:** The proposed technique to install capacitors has significant benefits and effective power consumption improvement when the cost of the imposed penalty is regarded as high. The trade-off in this technique is between the cost of the installed capacitors and the saving gained from the compensation.
4)	Ayman Agha Audih Alfaoury	**Long -Term Energy Losses Analyses for Jordanian Power System"**	This paper aims to investigate the electrical energy losses (ΔE) in the Jordanian national electrical power system their types, values, as well as their impacts on overall performance of the energy system. The main focus of the paper is to calculate and investigate the value of the technical losses (ΔET) as well as the commercial losses (ΔEC) to the whole system losses value. In this paper, analyses of the (ΔE) data are carried out for the last sixteen years. This period of time is divided in two equal intervals of time; which are (2000-2007) and (2008-2015). The analyses concentrate mainly on the (ΔEC) with special attention on the black losses of energy (theft), ($\Delta EB1$). The results of the two time periods are compared and evaluated by using statistical indexes. Furthermore the paper attempts to provide answers to the following questions: How and up to what value can (ΔEC) be minimized? What is the economic influence of (ΔEC) in [MWh]? Finally, a set of conclusions and recommendations on the obtained results are along with offered of the commercial losses for the next five years a forecast
5)	Omar Daoud Qadri Hamarsheh Ahlam Damati	**Multiparallel Processing for Enhancing the V2V Clustering Performance**	In order to support the demand of the users in the new generation wireless systems (such as the smart interaction between the mobile devices and the mobile human), the resources of the intelligent the transportation system should be utilized efficiently. Thus, the network structure adaptation due to the rapid changes in such a communication process should be investigated. This is in addition to save the direct impact of network resources such as high-speed data transmission and data processing. Based on the Vehicular Ad hoc Network (VANET) standard and (IEEE 802.11p), two main propositions have been examined to attain the improvement in such intelligent systems performance. In this paper, we improved the QoS and proposed a clustering algorithm named MP-RC-MBOFDM. It groups the mobile nodes based on their speeds with some modified head assignments processes. This will be combined with a parallel-processing technique and a wavelet processing stage to optimize the transmitted power phenomenon. The simulation results of five main efficiency factors that have been involved; namely complementary cumulative distributions, bit rates, energy efficiency, the cluster head life time and the ordinary nodes reattaching-head average times; show the feasibility of the new proposition in the V2V data transmission.
6)		**Enhancing the Performance of OFDM Systems-Based PAPR Reduction**	In this work, a comparison has been made among different proposed algorithms in order to improve the performance of a power consumption wireless network. They are used to combat one of the Orthogonal Frequency Division Multiplexing (OFDM) technique drawbacks, which are considered as a key technique in enhancing the new era of wireless systems' quality of service (QoS). Therefore,

			three different propositions have been investigated and covered by this work and classified as linear coding based, wavelet transformation based, PWM based. Furthermore, a MATLAB program has been run to check their performance and covers two different criteria; the curves of CCDF and the SER curves. This is in order to reduce the Peak-to-Average Power Ratio (PAPR) effect.
7)		**DVB-T Systems Performance Enhancement**	In this work, a proposition has been studied in order to check the Terrestrial Digital Video Broadcasting (DVB-T) enhancement. It deals with overcoming the effect of the Peak-to-Average Power Ratio (PAPR) drawback on wireless systems? performances. For this purpose, a special averaging technique has been introduced in this work and consists of three different stages; signal's noise removal, adaptively peak detection, and averaging filtration, consequently. In order to check the work efficiency, a MATLAB simulation has been conducted at the same bandwidth and channel conditions to deals with both BER curves and CCDF curves. As a result, the proposed work shows promising results over the proposed work in the literature and over our previously published work. The proposed work gives extra immunity against the channel noise reaches up to 25% over the literature. Furthermore, it gives an extra 15% reduction in combatting the PAPR effect.
8)		**Enhancing the LTE-based intelligent transportation system's performance**	An intelligent transportation system is considered as one of the main features of the new generation wireless systems, where both high-speed data transmission and processing play a crucial role. This work presents two propositions in order to attain the performance improvement for both data transmission and processing speed. Thus, the presented work consists of deriving a clustering algorithm based on a weighting algorithm for the head assignments processes and emphasizing the parallel-processing technique based on a variety of wavelet baby functions, respectively. Accordingly, both of the data transmission speed and power will be examined. In order to verify the findings, a simulation has been done and compared with the following clustering algorithms; namely DMAC, PC, DBC, and Lower-ID DCA. This comparison is based on the following factors; namely, efficiency factors involved in this investigation; namely complementary cumulative distributions, bit rates, energy efficiency, the cluster head lifetime and the ordinary nodes reattaching-head average times. The depicted results for the cluster head duration at 20 km/s show remarkable system stability based on both the clustering overhead and the cluster head duration. The attained improvements reach the53% and 88.4% over the DBC work and the Lowest-ID DCA work, respectively.
9)		**On the Parallel Processing for Wireless Sensors Converged Network**	This paper studies the capability of multi-parallel processing to be accommodated in machine-to-machine communications. A testbed convergence between the wireless sensor network and the wireless mobile network is performed. It deals with enhancing wireless mobile network performance. This testbed is divided into three stages; combating the peak-to-average power ratio problem, observing a real data making use of actual wireless sensors, and proposing multi-parallel processing communications. The mentioned testbed above is done in a realistic academic environment, where selected signals from those sensors are evaluated. Thus, a design improvement is detailed in terms of the peak-to-average power ratio and the efficient use of limited resources. In particular, the scope focuses on the mitigation of the nonlinear distortion and its effect on a bit error rate. The validation process is attained based on performing an extensive simulation. It is observing certain performance parameters such as the sensor lifetime, and the consumed energy. From the testbed simulation results, the proposed work shows promising results comparing to the conventional wireless sensor network. The delay reduction reaches around 85%, while the peak to average power ratio values has improved by 42.3%.
10)		**The Performance of the Vehicular Communication-Clustering Process**	For the new wireless systems and beyond, the intelligent transportation system is considered as one of the main features that could be covered in the new research topics. Furthermore, both high-

			speed data transmission and data processing play a crucial role in these generations. Our work covers two main propositions in order to attain an improvement in such intelligent systems performance. A clustering algorithm is proposed and presented for grouping mobile nodes based on their speeds with some modified head assignments processes. This will be combined with a parallel-processing technique that enhances the QoS. Mainly, this work concerns enhancing the V2V data transmission and the processing speed. Thus, a wavelet processing stage has been imposed to optimize the transmitted power phenomenon. In order to check the validity of such a proposition, five main efficiency factors have been investigated; namely complementary cumulative distributions, bit rates, energy efficiency, the lifetime of cluster head, and the ordinary nodes reattaching-head average times.
11)	Omar Daoud Marwan Al-Akaidi	**Fast-Frequency-Hopping-OFDM Technology to Enhance the V2V Systems Bandwidth Performance**	The work presented in this paper describes a clustering proposition for the V2V communications based on LTE systems. Two main propositions have been covered in this paper; a clustering algorithm and a multiparallel processing. The clustering algorithm is proposed and compared to the literature based on a clustering weighting factor. The system QoS has been checked after imposing the parallel-processing technique based on Daubechies wavelet functions. In order to test the validity of the clustering performance enhancement, a simulation environment has been built to measure the performance of cluster's head life time and their overhead. Our results show a noticeable stability specially for the clustering overhead, and the cluster head duration. Furthermore, the results are compared to both of the Lowest-ID DCA and to the PC based work and it shows a performance improvements that reaches to 50% over the Lowest-ID DCA based work at the speed of 70km/h.
12)	Omar Daoud Ahlam Damati	**Wireless Sensors Converged Network Enhancement**	This work deals with the proposition of machine-to-machine communications enhancement. Thus, a convergence between the wireless sensor network and the wireless mobile network has been studied. It is divided into three main parts; making use of one of our previously published work to enhance the wireless mobile network based on combatting the peak-to-average power ratio problem, building an actual wireless sensor network to observe a real data, and proposing a converged network as an enhancement. To validate the proposition, an extensive simulation has been performed based on observing some cretin performance parameters such as the round, the dying time, the consumed energy. Thus, the comparison has been made between the conventional wireless sensor network and the converged one. It shows a remarkable results and reaches 78
13)	Omar Daoud	**Power Reallocation and Complexity Enhancement for a Multi-Antennas Multi-Bands Orthogonal Wavelet Division Multiplexing-Based Systems**	Competitiveness in the modern wireless systems' provided services is a key factor in the development, in addition to the adaptation to/harmonization of user demand. Therefore, this paper discussed the quality of services from the point of view of the need for supporting the needed data rates. For this purpose, a benchmark based on Multi-Antenna Multiband Orthogonal Frequency Division Multiplexing has been proposed to compatible with Ultra-Wideband systems such as the fifth generation based technologies. In order to enhance the system quality of service, the structure of the ultra-wideband system's main stage; namely Orthogonal Frequency Division Multiplexing has been modified by imposing a low complexity designed Haar-wavelets stage instead of the fast Fourier transform stage. This is in addition to reallocate the transmitted power in order to reduce the effect of one of the main drawbacks that is found in the Orthogonal Frequency Division Multiplexing; namely the peak-to-average power ratio problem. A MATLAB simulation has been performed in order to validate the propositions that have been made based on six different performance factors. As a result, the new propositions were achieved our targets by reducing the system's complexity in terms of mathematical operations and by giving promising results in managing the transmitted powers. Furthermore, the effectiveness of such work has been verified and compared with four different work in the literature
14)		**MultiBands Orthogonal Wavelet Division**	This paper takes the existing wireless communications efficiency into consideration and imposes a new proposition based on

		Multiplexing: Complexity and Power Peaks Enhancement	multiband orthogonal frequency division multiplexing (MBOFDM) benchmark. It has been investigated terms of power efficiency and frame error rates. Thus and due to that the recent standards pursue the effect of the peak-to-average power ratio (PAPR) on the system's performance, two propositions have been made; the first one is based on replacing the inverse fast Fourier transform with a low-complexity Haar basis discrete wavelet transform (DWT), while the second one is about converting the transmitted signal into a constant envelope by proposing a simple conversion method based on the pulse width modulation (PWM) technique. A numerical model has been verified based on a performed MATLAB simulation. It shows that the proposed Haar work gives a very promising complexity reduction results from the system structure point of view. Comparing to the literature, the proposed work achieves a potential system's performance enhancement from the power amplifier efficiency point of view. Therefore, the target has been fulfilled and both of the consumed energy and the mutual information rate have been enhanced.
15)	Emad Awada	Wavelet Transform Algorithm in Testing ADC Effective Number of Bits Based on Hilbert Transform	In today advanced digital signal processing, many parameters must be tested to evaluate the accuracy performance of system output. Therefore, focusing down into an essential part of signal converts (Analog to Digital Converts) is a must prior to any system evaluations. As a result, this work will emphasize on the testing enhancement of Analog to Digital Converts parameters, such as Effected Number of Bits, to determine the accuracy of waveform regeneration and device performance with a newly implemented algorithm. That is, a new algorithm based on structuring Discrete Wavelet transform decomposition on prior interleave Hilbert transform, of Analog to Digital Converts output waveform, to measure Converts ability to reproduce a waveform in their full capacity. With such arrangement, the new algorithm intends to improve previous work for the testing process, higher testing accuracy, fewer computation data samples, and provide a platform of modulation process for other parameters measurement at the same time.
16)	Emad Awada E. Radwan K. Salih, E M. Nour	Modified Phase Locked Loop for Grid Connected Single Phase Inverter	Connecting a single-phase or three-phase inverter to the grid in distributed generation applications requires synchronization with the grid. Synchronization of an inverter-connected distributed generation units in its basic form necessitates accurate information about the frequency and phase angle of the utility grid. Phase Locked Loop (PLL) circuit is usually used for the purpose of synchronization. However, deviation in the grid frequency from nominal value will cause errors in the PLL estimated outputs, and that's a major drawback. Moreover, if the grid is heavily distorted with low order harmonics the estimation of the grid phase angle deteriorates resulting in higher oscillations (errors) appearing in the synchronization voltage signals. This paper proposes a modified time delay PLL (MTDPLL) technique that continuously updates a variable time delay unit to keep track of the variation in the grid frequency. The MTDPLL is implemented along a Multi-Harmonic Decoupling Cell (MHDC) to overcome the effects of distortion caused by gird lower order harmonics. The performance of the proposed MTDPLL is verified by simulation and compared in terms of performance and accuracy with recent PLL techniques.
17)	Emad Awada M. Sadiku S. Musa	Stochastic Computing: An Introduction	Stochastic Computing (SC) essentially represents numbers as streams of random bits and reconstructs numbers by calculating frequencies. It employs random bits to calculate via simpler circuits and with greater tolerance for errors. As a computing paradigm, SC is currently undergoing a revival. Since stochastic circuits have a small size, SC has regained interest recently due to its potential usage in some emerging nanotechnologies. In this paper, we briefly present stochastic computing and discuss its applications, benefits, and challenges.
18)	Emad Awada E. Radwan M. Nour A .Bani Younis	Fuzzy Logic Control for Low Voltage Ride Through a Single Phase Grid Connected PV Inverter	This paper presents a control scheme for a photovoltaic (PV) system that uses a single-phase grid-connected inverter with low-voltage ride-through (LVRT) capability. In this scheme, two PI regulators are used to adjust the power angle and voltage modulation index of

			the inverter; therefore, controlling the inverter's active and reactive output power, respectively. A fuzzy logic controller (FLC) is also implemented to manage the inverter's operation during the LVRT operation. The FLC adjusts (or de-rates) the inverter's reference active and reactive power commands based on the grid voltage sag and the power available from the PV system. Therefore, the inverter operation has been divided into two modes: (i) Maximum power point tracking (MPPT) during the normal operating conditions of the grid, and (ii) LVRT support when the grid is operating under faulty conditions. In the LVRT mode, the de-rating of the inverter active output power allows for injection of some reactive power, hence providing voltage support to the grid and enhancing the utilization factor of the inverter's capacity. The proposed system was modelled and simulated using MATLAB Simulink. The simulation results showed good system performance in response to changes in reference power command, and in adjusting the amount of active and reactive power injected into the grid.
19)	Emad Awada M. Sadiku S. Musa	**Exascale Computing (Supercomputers): An Overview of Challenges and Benefits**	Exascale computing is the term given to the next 50-100 fold increase in speed over the fastest supercomputers in use today. This super powerful machine is poised to transform modeling and simulation in science and engineering. It is hoped that the exascale machines will solve some or all of the major problems that are facing us today. This paper provides a brief introduction to exasclae computing where implementation and applications of such a system will be discussed to point out the venture challenges and tremendous benefits of function execution precision, fast data compiling and many other improving system qualities

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