

ISI Papers in highlight





Selected from the most recent 10 years of data, Highly Cited Papers reflect the top 1% of papers by field and publication year. Highly Cited Papers help identify breakthrough research within a research field and are used within Web of Science to identify and refine the most influential research papers.

| Boldea, I., Tutelea, L.N., Parsa, L., Dorrell, D. Automotive Electric Propulsion Systems With Reduced or No Permanent Magnets: An Overview, IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS, Volume: 61, Issue: 10, Pages: 5696–5711, ISSN: 0278–0046, eISSN: 1557–9948, 2014; Times Cited in Web of Science Core Collection: 365 | Y Highly Cited Paper |
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| Precup, R.E., Hellendoorn, H. A survey on industrial applications of fuzzy control, COMPUTERS IN INDUSTRY, Volume: 62, Issue: 3, Pages: 213-226, ISSN: 0166-3615, eISSN: 1872-6194, 2011; Times Cited in Web of Science Core Collection: 311 | Y Highly Cited Paper |
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| Sarbu, I., Sebarchievici, C. General review of ground-source heat pump systems for heating and cooling of buildings, ENERGY AND BUILDINGS, Volume: 70, Pages: 441–454, ISSN: 0378–7788, eISSN: 1872–6178, 2014; Times Cited in Web of Science Core Collection: 257 | Y Highly Cited Paper |
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Highly Cited Papers received enough citations as of January/December 2020 to place them in the top 1% of their academic fields based on a highly cited threshold for the field and publication year.

* The data was obtained from Web of Science - Clarivate Analytics in 30 March 2021



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| Gavruta, L. Frames for operators, APPLIED AND COMPUTATIONAL HARMONIC ANALYSIS, Volume: 32, Issue: 1, Pages: 139–144, ISSN: 1063–5203, 2012; Times Cited in Web of Science Core Collection: 100 | Y Highly Cited Paper |
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| Rajak, D.K., Pagar, D.D., Menezes, P.L., Linul, E. Fiber-Reinforced Polymer Composites: Manufacturing, Proper- ties, and Applications, POLYMERS, Volume: 11, Issue: 10, Article Number: 1667, PubMed ID: 31614875, eISSN: 2073-4360, 2019; Times Cited in Web of Science Core Collection: 75 | Y Highly Cited Paper |
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| Sarbu, I., Dorca, A. Review on heat transfer analysis in thermal energy storage using latent heat storage systems and phase change materials, INTERNATIONAL JOURNAL OF ENERGY RESEARCH, Volume: 43, Issue: 1, Pages: 29-64, ISSN: 0363-907X, eISSN: 1099-114X, 2019; Times Cited in Web of Science Core Collection: 48 | Y Highly Cited Paper |
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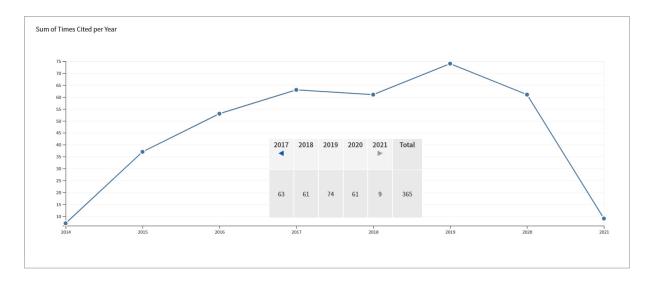
| onto magnetic iron Pages: 3704–3722, I | Pacurariu, C., Locovei, C. Single and simultaneous adsorption of methyl orang oxide/carbon nanocomposites, ARABIAN JOURNAL OF CHEMISTRY, Volume: SSN: 1878–5352, eISSN: 1878–5379, 2019; of Science Core Collection: 25 | 12 / 12 / 12 | ighly Cited Paper |
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| at cryogenic temper 0925–8388, elSSN: ⁻ | i, K., Linul, P.A., Linul, E. Mechanical properties of A356 and ZA27 metallic syn ature, JOURNAL OF ALLOYS AND COMPOUNDS, Volume: 813, Article Number: 1 873-4669, 2020; of Science Core Collection: 23 | 150101 ICCNI- | ighly Cited Paper |
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| Meszaros, J., Zhuang Practices in UAS-ba 1001, eISSN: 2072-4 | a, S., Aasen, H., James, M.R., Goncalves, G., Ben-Dor, E., Brook, A., Polinova, M ŋ, R.D., Johansen, K., Malbeteau, Y., de Lima, I.P., Davids, C., Herban, S., McCabe sed Environmental Monitoring, REMOTE SENSING, Volume: 12, Issue: 6, Art 1292, 2020; of Science Core Collection: 18 | , M.F. Current | ighly Cited Paper |
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| Hand Myoelectric-B Issue: 7, Pages: 462 | A., Albu, A., Borlea, A.B., Zamfirache, I.A., Petriu, E.M. Evolving Fuzzy Models ased Control, IEEE TRANSACTIONS ON INSTRUMENTATION AND MEASUREMENT 5-4636, ISSN: 0018–9456, eISSN: 1557–9662, 2020; of Science Core Collection: 16 | | ighly Cited Paper |
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| under room and cry 106274, ISSN: 0013 | L., Valean, C., Banica, R. Static and dynamic mode I fracture toughness of rigi ogenic temperatures, ENGINEERING FRACTURE MECHANICS, Volume: 225, Art -7944, eISSN: 1873–7315, 2020; of Science Core Collection: 14 | ticle Number | ighly Cited Paper |
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Web of Science - Clarivate Analytics Highly Cited Paper

As of January/December 2020, this highly cited paper received enough citations to place it in the top 1% of the academic field of **Engineering** based on a highly cited threshold for the field and publication year.



Boldea, I., Tutelea, L.N., Parsa, L., Dorrell, D. Automotive Electric Propulsion Systems With Reduced or No Permanent Magnets: An Overview, IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS, Volume: 61, Issue: 10, Pages: 5696–5711, ISSN: 0278–0046, eISSN: 1557–9948, 2014; Times Cited in Web of Science Core Collection: 365

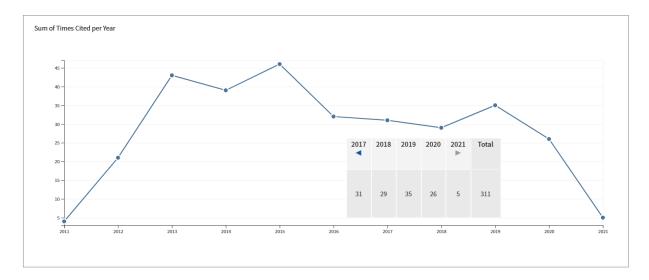
Abstract: Hybrid and electric vehicle technology has seen rapid development in recent years. The motor and the generator are at the heart of the vehicle drive and energy system and often utilize expensive rare-earth permanent magnet (PM) material. This paper reviews and addresses the research work that has been carried out to reduce the amount of rare-earth material that is used while maintaining the high efficiency and performance that rare-earth PM machines offer. These new machines can use either less rare-earth PM material,

weaker ferrite magnets, or no magnets; and they need to meet the high performance that the more usual interior PM synchronous motor with sintered neodymium-iron-boron magnets provides. These machines can take the form of PM-assisted synchronous reluctance machines, induction machines, switched reluctance machines, wound rotor synchronous machines (claw pole or biaxially excited), doublesaliency machines with ac or dc stator current control, or brushless dc multiple-phase reluctance machines.





As of January/December 2020, this highly cited paper received enough citations to place it in the top 1% of the academic field of **Computer Science** based on a highly cited threshold for the field and publication year.



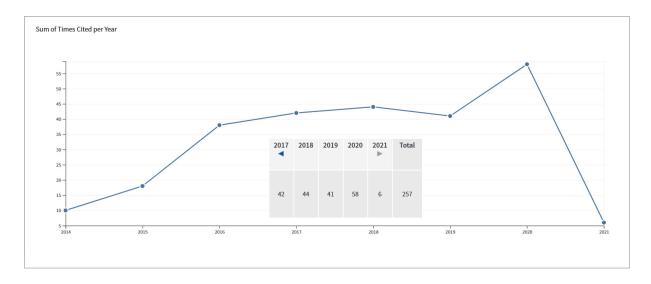
Precup, R.E., Hellendoorn, H. A survey on industrial applications of fuzzy control, COMPUTERS IN INDUSTRY, Volume: 62, Issue: 3, Pages: 213–226, ISSN: 0166-3615, eISSN: 1872-6194, 2011; Times Cited in Web of Science Core Collection: 311

Abstract: Fuzzy control has long been applied to industry with several important theoretical results and successful results. Originally introduced as model-free control design approach, model-based fuzzy control has gained widespread significance in the past decade.

This paper presents a survey on recent developments of analysis and design of fuzzy control systems focused on industrial applications reported after 2000.

Web of Science - Clarivate Analytics Highly Cited Paper

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Sarbu, I., Sebarchievici, C. General review of ground-source heat pump systems for heating and cooling of buildings, ENERGY AND BUILDINGS, Volume: 70, Pages: 441-454, ISSN: 0378-7788, eISSN: 1872-6178, 2014; Times Cited in Web of Science Core Collection: 257

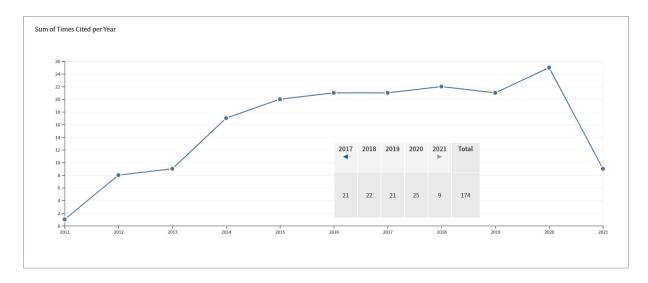
Abstract: A large number of ground-source heat pumps (GSHP) systems have been used in residential and commercial buildings throughout the world due to the attractive advantages of high energy and environmental performances. The GSHPs are proven renewable energy technology for space heating and cooling. This paper provides a detailed literature review of the GSHP systems, and their recent advances. The operation principle and energy efficiency of a heat pump are defined first. Then, a general introduction on the GSHPs and its development, and a detailed description of the surface water (SWHP), ground-water (GWHP), and ground-couplet (GCHP) heat pumps are performed. The most typical simulation and ground thermal response

test models for the vertical ground heat exchangers currently available are summarized including the heat transfer processes outside and inside the boreholes. Also, some information about a new GWHP using a heat exchanger with special construction, and the possibility to obtain the better energy efficiency with combined heating and cooling by GCHP are presented. The various hybrid GCHP systems for cooling or heating-dominated buildings are well described. Finally, the energy, economic and environmental performance of a closedloop GCHP system is also briefly reviewed. It is found that the GSHP technology can be used both in cold and hot weather areas and the energy saving potential is significant.





As of January/December 2020, this highly cited paper received enough citations to place it in the top 1% of the academic field of **Engineering** based on a highly cited threshold for the field and publication year.



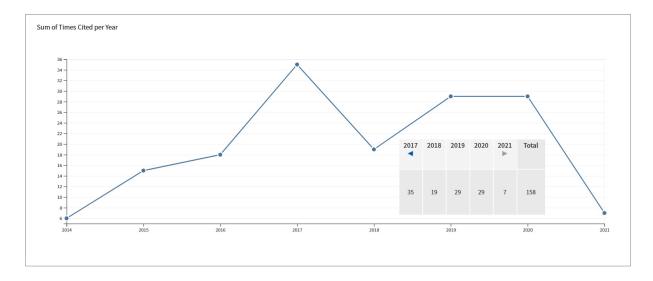
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Abstract: This work presents investigations on the total removal of chromium from Cr(VI) aqueous solutions by reduction with scrap iron and subsequent precipitation of the resulted cations with NaOH. The process was detrimentally affected by a compactly passivation film occurred at scrap iron surface, mainly composed of Cr(III) and Fe(III). Maximum removal efficiency of the Cr(total) and Fe(total) achieved in the clarifier under circumneutral and alkaline (pH 9.1) conditions was 98.5% and 100%, respectively. The optimum precipitation pH range which resulted from this study is 7.6-8.0. Fe(total) and Cr(total) were

almost entirely removed in the clarifier as Fe(III) and Cr(III) species: however, after Cr(VI) breakthrough in column effluent, chromium was partially removed in the clarifier also as Cr(VI), by coprecipitation with cationic species. As long the column effluent was free of Cr(VI), the average Cr(total) removal efficiency of the packed column and clarifier was 10.8% and 78.8%, respectively. Our results clearly indicated that Cr(VI) contaminated wastewater can be successfully treated by combining reduction with scrap iron and chemical precipitation with NaOH.

Web of Science - Clarivate Analytics Highly Cited Paper

As of May/December 2020, this highly cited paper received enough citations to place it in the top 1% of the academic field of **Engineering** based on a highly cited threshold for the field and publication year.



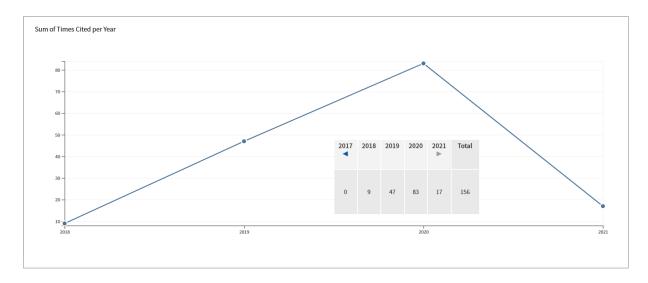
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Abstract: Providing cooling by utilizing renewable energy such as solar energy is a key solution to the energy and environmental issues. This paper provides a detailed review of different solar refrigeration and cooling methods. There are presented theoretical basis and practical applications for cooling systems within various working fluids assisted by solar energy and their recent advances. Thermally powered refrigeration technologies are classified into two categories: sorption technology (open systems or closed systems) and thermomechanical technology (ejector system). Solid and liquid desiccant cycles represent the open system. The liquid desiccant system has a higher thermal coefficient of performance (COP) than the solid desiccant system. Absorption and adsorption technologies represent the closed system. The adsorption cooling typically needs lower heat source temperatures than the absorption cooling. Based on COP, the absorption systems are preferred to the adsorption systems, the higher temperature issues can be easily handled with solar adsorption systems. The ejector system represents the thermo-mechanical cooling, and has a higher thermal COP but require a higher heat source temperature than other systems. The study also refers to solar hybrid cooling systems with heterogeneous composite pairs, to a comparison of various solar cooling systems, and to some use suggestions of these systems.





As of January/December 2020, this highly cited paper received enough citations to place it in the top 1% of the academic field of **Environment/ Ecology** based on a highly cited threshold for the field and publication year.



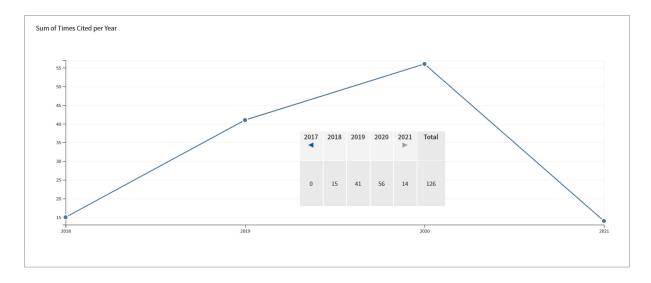
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Times Cited in Web of Science Core Collection: 156

Abstract: Thermal energy storage (TES) is a technology that stocks thermal energy by heating or cooling a storage medium so that the stored energy can be used at a later time for heating and cooling applications and power generation. TES systems are used particularly in buildings and in industrial processes. This paper is focused on TES technologies that provide a way of valorizing solar heat and reducing the energy demand of buildings. The principles of several energy storage methods and calculation of storage capacities are described. Sensible heat storage technologies, including water tank, underground, and packed-bed storage methods, are briefly reviewed. Additionally, latent-heat storage systems associated with phasechange materials for use in solar heating/cooling of buildings, solar water heating, heat-pump systems, and concentrating solar power plants as well as thermo-chemical storage are discussed. Finally, cool thermal energy storage is also briefly reviewed and outstanding information on the performance and costs of TES systems are included.

Web of Science - Clarivate Analytics Highly Cited Paper

As of January/December 2020, this highly cited paper received enough citations to place it in the top 1% of the academic field of **Engineering** based on a highly cited threshold for the field and publication year.



Ancuti, C.O., Ancuti, C., De Vleeschouwer, C., Bekaert, P. Color Balance and Fusion for Underwater Image Enhancement, IEEE TRANSACTIONS ON IMAGE PROCESSING, Volume: 27, Issue: 1, Pages: 379-393, PubMed ID: 28981416, ISSN: 1057–7149, eISSN: 1941–0042, 2018; Times Cited in Web of Science Core Collection: 126

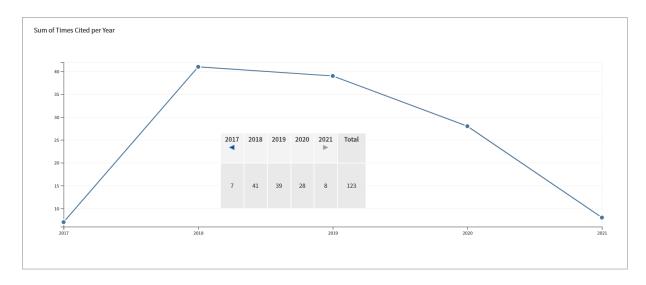
Abstract: We introduce an effective technique to enhance the images captured underwater and degraded due to the medium scattering and absorption. Our method is a single image approach that does not require specialized hardware or knowledge about the underwater conditions or scene structure. It builds on the blending of two images that are directly derived from a color-compensated and white-balanced version of the original degraded image. The two images to fusion, as well as their associated weight maps, are defined to promote the transfer of edges and color contrast to the output

image. To avoid that the sharp weight map transitions create artifacts in the low frequency components of the reconstructed image, we also adapt a multiscale fusion strategy. Our extensive qualitative and quantitative evaluation reveals that our enhanced images and videos are characterized by better exposedness of the dark regions, improved global contrast, and edges sharpness. Our validation also proves that our algorithm is reasonably independent of the camera settings, and improves the accuracy of several image processing applications, such as image segmentation and keypoint matching.





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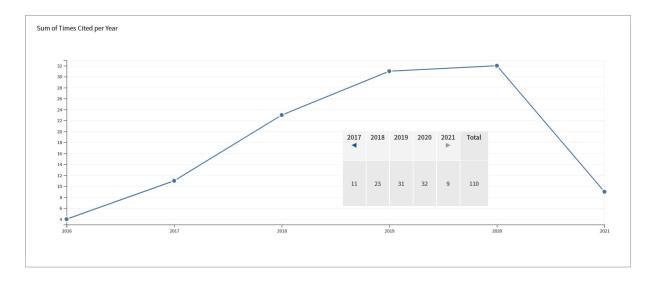
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Abstract: This paper proposes an innovative tuning approach for fuzzy control systems (CSs) with a reduced parametric sensitivity using the Grey Wolf Optimizer (GWO) algorithm. The CSs consist of servo system processes controlled by Takagi-Sugeno-Kang proportional-integral fuzzy controllers (TSK PI-FCs). The process models have second-order dynamics with an integral component, variable parameters, a saturation, and dead-zone static nonlinearity. The sensitivity analysis employs output sensitivity functions of the sensitivity models defined

with respect to the parametric variations of the processes. The GWO algorithm is used in solving the optimization problems, where the objective functions include the output sensitivity functions. GWO's motivation is based on its low-computational cost. The tuning approach is validated in an experimental case study of a position control for a laboratory nonlinear servo system, and TSK PI-FCs with a reduced process small time constant sensitivity are offered.

Web of Science - Clarivate Analytics Highly Cited Paper

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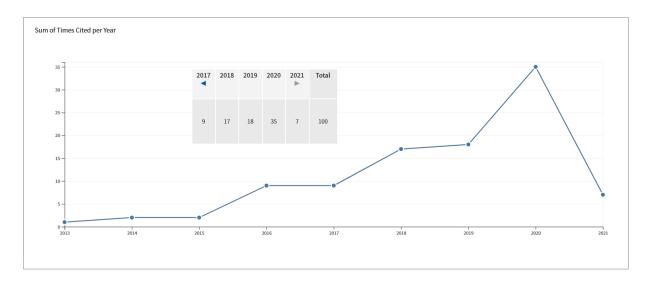
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Abstract: Adsorption of Cr(VI) on MnO2 was investigated with respect to effect of pH, temperature, ionic strength, initial Cr(VI) concentration, co-presence of different anions (HCO3-, SO42-, H2PO4-, NO3- and Cl-) and of low molecular weight natural organic materials (LMWNOM) (acetate, oxalate and citrate). The process was rapid during the first 3-5 min, reaching equilibrium after one hour. Adsorption decreased with increasing pH, temperature and Cr(VI) initial concentration, and increased with increasing ionic strength. Co-presence of phosphate, sulfate, bicarbonate, citrate and oxalate hindered Cr(VI) adsorption, whereas nitrate, chloride and acetate did not exert any notable influence. The overall order of Cr(VI) adsorption suppression due to co-presence of anions and LMWNOM was H2PO4 > HCO3- > SO42-, and oxalate > citrate, respectively. Highest experimental equilibrium sorption capacity (0.83 mg g(-1)) was obtained at 20 degrees C and pH 5.9, while lowest (0.18 mg g(-1)) was noticed in the co-presence of H2PO4-, at 20 degrees C and pH 6.9. Adsorption kinetics was successfully fitted by pseudo-second-order model. Mechanisms for both specific and non-specific adsorption are likely to be involved, while rate-controlling step involved both intra-particle and film diffusion processes. Cr(VI) was strongly bound to MnO2, which makes risks of its subsequent liberation into the environment to be low.





As of May/June and September/December 2020, this highly cited paper received enough citations to place it in the top 1% of the academic field of **Mathematics** based on a highly cited threshold for the field and publication year.



Gavruta, L. Frames for operators, APPLIED AND COMPUTATIONAL HARMONIC ANALYSIS, Volume: 32, Issue: 1, Pages: 139-144, ISSN: 1063-5203, 2012;

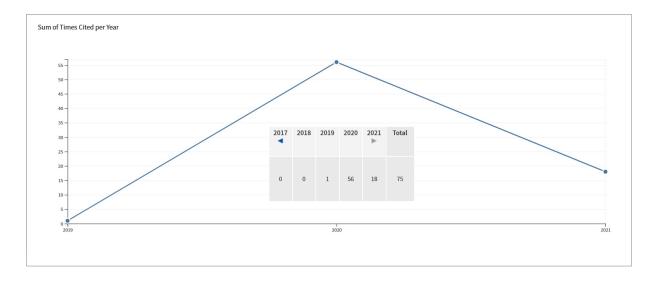
Times Cited in Web of Science Core Collection: 100

Abstract: Frames in Hilbert spaces are a redundant set of vectors which yield a representation for each vector in the space. In the present paper, we give a generalization of frames, which allows, in a stable

way, to reconstruct elements from the range of a linear and bounded operator in a Hilbert space.

Web of Science – Clarivate Analytics Highly Cited Paper

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Rajak, D.K., Pagar, D.D., Menezes, P.L., Linul, E. Fiber-Reinforced Polymer Composites: Manufacturing, Properties, and Applications, POLYMERS, Volume: 11, Issue: 10, Article Number: 1667, PubMed ID: 31614875, eISSN: 2073-4360, 2019; Times Cited in Web of Science Core Collection: 75

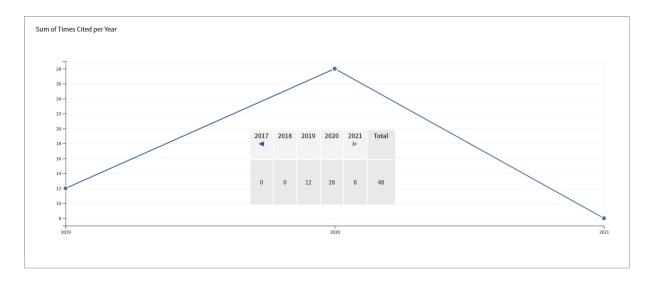
Abstract: Composites have been found to be the most promising and discerning material available in this century. Presently, composites reinforced with fibers of synthetic or natural materials are gaining more importance as demands for lightweight materials with high strength for specific applications are growing in the market. Fiber-reinforced polymer composite offers not only high strength to weight ratio, but also reveals exceptional properties such as high durability; stiffness; damping property; flexural strength; and resistance to corrosion, wear, impact, and fire. These wide ranges of diverse features have led composite materials to find applications in mechanical, construction, aerospace, automobile, biomedical, marine, and many other manufacturing industries. Performance of composite

materials predominantly depends on their constituent elements and manufacturing techniques, therefore, functional properties of various fibers available worldwide, their classifications, and the manufacturing techniques used to fabricate the composite materials need to be studied in order to figure out the optimized characteristic of the material for the desired application. An overview of a diverse range of fibers, their properties, functionality, classification, and various fiber composite manufacturing techniques is presented to discover the optimized fiber-reinforced composite material for significant applications. Their exceptional performance in the numerous fields of applications have made fiber-reinforced composite materials a promising alternative over solitary metals or alloys.





As of January/December 2020, this highly cited paper received enough citations to place it in the top 1% of the academic field of **Engineering** based on a highly cited threshold for the field and publication year.

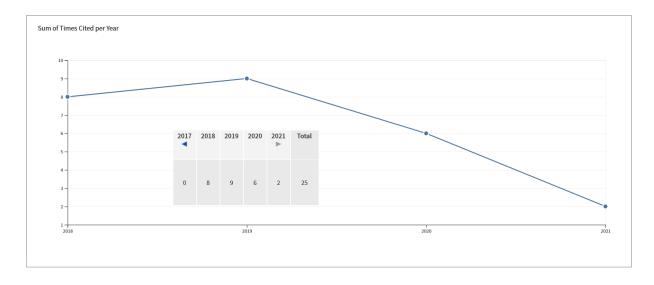


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Abstract: Thermal energy storage (TES) is a technology that stocks thermal energy by heating or cooling a storage medium so that the stored energy can be used later for heating and cooling applications and for power generation. TES has recently attracted increasing interest to thermal applications such as space and water heating, waste heat utilisation, cooling, and air conditioning. Phase change materials (PCMs) used for the storage of thermal energy as latent heat are special types of advanced materials that substantially contribute to the efficient use and conservation of waste heat and solar energy. This paper provides a comprehensive review on the development of latent heat storage (LHS) systems focused on heat transfer and enhancement techniques employed in PCMs to effectively charge and discharge latent heat energy, and the formulation of the phase change problem. The main categories of PCMs are classified and briefly described, and heat transfer enhancement technologies, namely dispersion of low-density materials, use of porous materials, metal matrices and encapsulation, incorporation of extended surfaces and fins, utilisation of heat pipes, cascaded storage, and direct heat transfer techniques, are also discussed in detail. Additionally, a two-dimensional heat transfer simulation model of an LHS system is developed using the control volume technique to solve the phase change problem. Furthermore, a three-dimensional numerical simulation model of an LHS is built to investigate the quasi-steady state and transient heat transfer in PCMs. Finally, several future research directions are provided.

Web of Science – Clarivate Analytics Highly Cited Paper

As of January/February 2020, this highly cited paper received enough citations to place it in the top 1% of the academic field of **Chemistry** based on a highly cited threshold for the field and publication year.



Istratie, R., Stoia, M., Pacurariu, C., Locovei, C. Single and simultaneous adsorption of methyl orange and phenol onto magnetic iron oxide/carbon nanocomposites, ARABIAN JOURNAL OF CHEMISTRY, Volume: 12, Issue: 8, Pages: 3704–3722, ISSN: 1878–5352, eISSN: 1878–5379, 2019; Times Cited in Web of Science Core Collection: 25

Abstract: Magnetic iron oxide/carbon nanocomposites were synthesized by a facile, one-step solvothermal method. The magnetic nanopowders were characterized by X-ray diffraction (XRD), Fourier transform infrared (FTIR) spectroscopy, thermal analysis (DSC-TG), scanning electron microscopy (SEM), specific surface area and particle size measurements, pore size distributions and magnetic properties. The magnetic nanopowders were tested as adsorbents for the removal of methyl orange (MO) and phenol (Ph) from aqueous solutions. The effects of solution pH, contact time, adsorbent dose and initial pollutants concentration on the adsorption of MO and phenol onto the investigated adsorbents were studied. A significant increase in the removal efficiency, both for MO and phenol, with the increase in the carbon content of the magnetic nanopowder was evidenced.

New experimental data were provided regarding the bicomponent adsorption of MO and phenol. Pseudo-second order equation was fitted to the kinetic data and four isotherm models, namely Langmuir, Freundlich, Redlich-Peterson and Sips were used to analyze the equilibrium data in both single and binary-component solutions. The investigated adsorbents showed a higher adsorption capacity toward MO than phenol. The simultaneous adsorption of the two pollutants in bicomponent solutions indicated that the MO adsorption is practically not affected by the presence of phenol while the adsorption of phenol is significantly reduced in the presence of MO. The benefits of obtaining low-cost nanocomposites with adsorption capacity and magnetic separation tailored, effective in single and bicomponent adsorption of MO and phenol, represent strong arguments regarding their great potential for practical applications.





As of May/December 2020, this highly cited paper received enough citations to place it in the top 1% of the academic field of **Materials Science** based on a highly cited threshold for the field and publication year.



Fiedler, T., Al-Sahlani, K., Linul, P.A., Linul, E. Mechanical properties of A356 and ZA27 metallic syntactic foams at cryogenic temperature, JOURNAL OF ALLOYS AND COMPOUNDS, Volume: 813, Article Number: 152181, ISSN: 0925-8388, eISSN: 1873-4669, 2020; Times Cited in Web of Science Core Collection: 23

Abstract: This work presents compressions tests of metallic foams at cryogenic temperature. The investigated syntactic foams were manufactured by combining a packed bed of expanded glass particles with either an aluminium or a zinc matrix using infiltration casting. Uni-axial compressions tests were performed after submerging samples in a bath of liquid nitrogen with an equilibrium temperature of -196 degrees C. Both the solid matrix material and syntactic foam

samples were tested. For comparison, room temperature reference data from the literature was obtained. In addition, the effect of thermal treatment on the mechanical behaviour of both alloys and their foams at cryogenic temperature was addressed. The results indicate significant embrittlement at cryogenic temperature; however, aluminium and its foams are less susceptible to this effect.

Web of Science - Clarivate Analytics Highly Cited Paper

As of July/December 2020, this highly cited paper received enough citations to place it in the top 1% of the academic field of **Geosciences** based on a highly cited threshold for the field and publication year.



Tmusic, G., Manfreda, S., Aasen, H., James, M.R., Goncalves, G., Ben-Dor, E., Brook, A., Polinova, M., Arranz, J.J., Meszaros, J., Zhuang, R.D., Johansen, K., Malbeteau, Y., de Lima, I.P., Davids, C., Herban, S., McCabe, M.F. Current Practices in UAS-based Environmental Monitoring, REMOTE SENSING, Volume: 12, Issue: 6, Article Number: 1001, eISSN: 2072-4292, 2020; Times Cited in Web of Science Core Collection: 18

Abstract: With the increasing role that unmanned aerial systems (UAS) are playing in data collection for environmental studies, two key challenges relate to harmonizing and providing standardized guidance for data collection, and also establishing protocols that are applicable across a broad range of environments and conditions. In this context, a network of scientists are cooperating within the framework of the Harmonious Project to develop and promote harmonized mapping strategies and disseminate operational guidance to ensure best practice for data collection and interpretation. The culmination of these efforts is summarized in the present manuscript. Through

this synthesis study, we identify the many interdependencies of each step in the collection and processing chain, and outline approaches to formalize and ensure a successful workflow and product development. Given the number of environmental conditions, constraints, and variables that could possibly be explored from UAS platforms, it is impractical to provide protocols that can be applied universally under all scenarios. However, it is possible to collate and systematically order the fragmented knowledge on UAS collection and analysis to identify the best practices that can best ensure the streamlined and rigorous development of scientific products.





As of November/December 2020, this highly cited paper received enough citations to place it in the top 1% of the academic field of **Engineering** based on a highly cited threshold for the field and publication year.



Precup, R.E., Teban, T.A., Albu, A., Borlea, A.B., Zamfirache, I.A., Petriu, E.M. Evolving Fuzzy Models for Prosthetic Hand Myoelectric-Based Control, IEEE TRANSACTIONS ON INSTRUMENTATION AND MEASUREMENT, Volume: 69, Issue: 7, Pages: 4625–4636, ISSN: 0018–9456, eISSN: 1557–9662, 2020;

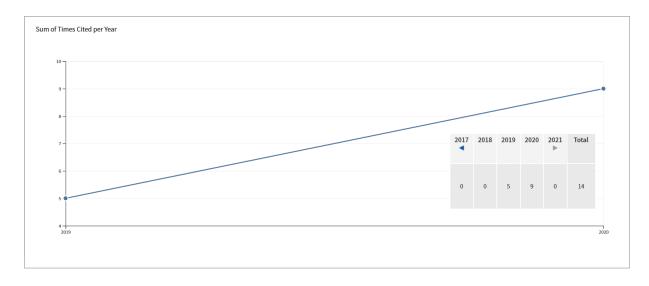
Times Cited in Web of Science Core Collection: 16

Abstract: This article applies an incremental online identification algorithm to develop a set of evolving fuzzy models (FMs) that characterize the nonlinear finger dynamics of the human hand for the myoelectric (ME)-based control of a prosthetic hand. The FM inputs are the ME signals obtained from eight ME sensors and past inputs and/or outputs. The FM outputs are the finger angles, considered here as the midcarpal joint angles, to ensure their control. The best evolving FMs that characterize each of the five fingers are described with the results validated on real data. Simple second-order linear models are

next given to enable the cost-effective controller design. Five separate control loops are proposed, with proportional-integral (PI) controllers separately tuned by a frequency-domain approach. Simple PI-fuzzy controllers are designed starting with the linear PI controllers to ensure the control system performance improvement. The evolving FMs are used to simulate accurately the behavior of the human hand. Digital simulation results are included to show the effectiveness of the PI-fuzzy controllers and the performance improvement in comparison to the initial PI ones.

Web of Science - Clarivate Analytics Highly Cited Paper

As of January/December 2020, this highly cited paper received enough citations to place it in the top 1% of the academic field of **Engineering** based on a highly cited threshold for the field and publication year.



Linul, E., Marsavina, L., Valean, C., Banica, R. Static and dynamic mode I fracture toughness of rigid PUR foams under room and cryogenic temperatures, ENGINEERING FRACTURE MECHANICS, Volume: 225, Article Number: 106274, ISSN: 0013-7944, eISSN: 1873-7315, 2020; Times Cited in Web of Science Core Collection: 14

Abstract: The research presented in this paper is an effort to better understand the fracture toughness of closed-cell rigid polyurethane (PUR) foams under different loading and temperature conditions. The effect of density (100, 145 and 300 kg/m(3)) and anisotropy (in-plane and out-of-plane loading directions) on both quasi-static and dynamic fracture behavior was also experimentally investigated. The three-point bending (3PB) tests were performed on Single Edge Notched Bend (SENB) samples, at room (25 degrees C) and cryogenic (-196 degrees C) temperatures, and the mode I fracture toughness (K-IC) was calculated from their load-displacement curves. It was

observed that all PUR foam samples, regardless of foam density and loading direction, showed a significant increase in K-IC at the cryogenic temperature. The out-of-plane obtained samples showed a slight improvement in fracture toughness (highlighting an anisotropic behavior), both under quasi-static and dynamic 3PB loads. The dynamic K-IC values were found higher than quasi-static ones, and irrespective of foam density and test condition, a brittle deformation mechanism without plastic deformation was observed for all samples. Finally, empirical formulations for cryogenic and dynamic K-IC based on room temperature mode I fracture toughness were proposed.

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