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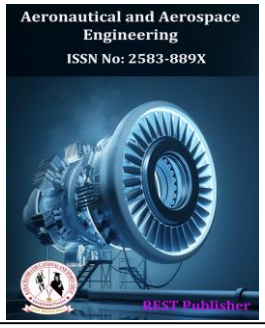

A Review on Power Systems and Power Electronics using the DEMATEL Method

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Abstract. *Focus is placed on all aspects of electrical energy as well as innovation in energy generation and delivery, three different approaches, and efficient technologies in energy and energy systems research. Research projects focus on systems and equipment for converting, supplying, and using energy as a form of electricity. In order to improve quality and efficiency and to promote the gradual materialization of intelligent, efficient energy, power electronics are increasingly a more fundamental component of power systems. Power systems use a wide variety of power electronics. Power systems is the physical study of converting electrical energy from one medium to another. More than 80% of the total electricity produced at a global average rate of 3.4 billion kilowatts per hour per year is reprocessed or recovered in industries like electronics. Electrical energy is processed or converted using power electronics converters, often known as power converters or switching converters. There are two types of electricity: AC power and DC power. Depending on the kind of power it uses, the distribution system is split into AC distribution systems and DC distribution systems. design about an electrical power system must include power system analysis. To ensure that the electrical system, including the system components, is appropriately defined to operate as intended, resist anticipated stress, and be safeguarded from failures, calculations and simulations are carried out. Power electronic benefits: power density that is high. improved energy conversion efficiency of up to 99%. Switching power supplies are employed in medical equipment with acoustically sensitive industrial applications to their dependability and efficiency. In general, issues like service disruptions and power outages are related to the reliability of the power supply. It is commonly stated that this is an attempt to rely on codes that are directly pertinent to the user. Standard dependency index values for US purposes include SAIFI, SAIDI, and CAIDI. DEMATEL (Decision Making Trial and Evaluation Laboratory) They are divided into analysis using the Nonmetal mineral product industry, General equipment manufacturing, Mining and washing of coal, Textile industry, Food manufacturing industry It is the interaction between the factors Visualized and assesses dependent relationships Through the structural model Also deals with identifying important.* ***Evaluation parameters:*** *Analog & Digital Electronics, Power Systems, Electric Circuits, Electric Machines and Digital Controllers. Power Systems and Power Electronics in Analog & Digital Electronics is got the first rank whereas is the Electric Circuits is having the Lowest rank. Power Systems and Power Electronics in Analog & Digital Electronics is got the first rank whereas is the Electric Circuits is having the Lowest rank*

Keywords: *MCDM, Analog & Digital Electronics, Power Systems, Electric Circuits, Electric Machines and Digital Controllers.*

1. INTRODUCTION

Power electronics-based power systems are propelled by the widespread use of electronic power conversions for applications including renewable energy generation and energy storage. A multi-time level control scheme that adjusts the current for the stability and quality of the electricity system is typically included in power converters. Electromagnetic interfaces of electrical machines and electrical networks [1]. Power electronics can then replace the coupling properties mentioned above with essentially decoupled domain relationships. This is brought about by the low impedance and high power factor of dc power sources and loads. Now, sources and loads in tightly regulated power converters have decoupled dq-domain computers that actively manage power flow and reduce power factor cycles in the system [2]. The fundamental problem underlying this paradigm change is how to make sure that the numerous incompatible participants in power electronics- and electric machine-based systems cooperate and sustain system stability. The coordination and cooperation of these players is then presented using a lateral structure based on the synchronization mechanism of Synchronous Machining (SM), which has supported the construction and operation for energy technologies for more than 100 years. Electrostatic converters act like virtual synchronous machines [3]. Increasing responsibilities in the field over the past three decades, power systems have been the subject of extensive research. Internet backbone equations have been formulated

and solved using a variety of methods. The three main simulation techniques that have been developed are nodal analysis, modified nodal analysis, and state-variable analysis. Several simulation programmes have been developed using these techniques. EMTP is the most widely used (using nodal analysis with fixed-step integration) For electrical equipment and power electronics, SPICE (using modified id3 algorithm with factor integration) is used for power networks. In the Simulink environment, the Power System Chunk Set (PSB) is a graphical tool that enables the creation and simulation of power systems. Using the MATLAB/Simulink environment, block sets depict typical elements and gadgets found in electrical power networks. In comparison to fixed-step algorithms, Simulink's variable-step event-sensitive assimilation algorithms enable more accurate zero-crossing detection of currents [4]. This energy electronic The revolution is already under way. Acid converters for high-voltage direct current (HVDC) transmission, VAR compensators that are static (two topics of companion papers), uninterruptible power supply for safeguarding delicate equipment, and drives for variable-speed motors are now developed using power electronics. Power semiconductor devices may eventually replace physical switches in distributed power lines, making electricity produced by windmills and photovoltaic facilities more easily consistent with utility transmission networks [5]. Systems without power systems, systems with largely rated electronics, and technologies with full voltage - controlled interface to wind turbines are the three main divisions of wind turbine technology. Induction generators are used in the wind turbines shown in to maintain practically constant speed (1–2% variance), regardless of torque variation. Power is aerodynamically constrained by pitch control, active stall, or stall. Typically, a soft-starter is utilised to lower the current during startup. To decrease (nearly completely remove) the reactive peak load from steam turbines, a dynamic compensator is needed [6]. Trucks that are electric, hybrid, plug-in hybrid, or fuel cell-powered all contain multi-converter power communication equipment, also known as power electronic intensive power sources. Several dc type converters and inverters are connected between various buses. There are power semiconductor units in number of co power systems that are loaded by other dc power converters/inverters [7]. power system based on electronics. A meshed and symmetrical three-phase network with several current- and amperage inverters with LCL- and LC-filters is subjected to an impedance-based analytical technique. The nodal admittance matrix is suggested as a way for obtaining the impedance ratios for various inverters so that the effect of each circuit to the harmonic steadiness of the overall power system may be determined. In recent years, the amount of electronics used in electricity systems has increased. Electro-electronic power production systems are evolving into crucial elements of power grids like renewable power plants and micro grids over time, spurred by the rapid growth in alternative energy sources and motor speeds [8]. Due to the constant-power nature most individual components, power-electronic-based systems are vulnerable to negative impedance instability; however, prior research indicates that such instabilities can be prevented in some systems by altering power electronic controls. Based on the dc interface used to construct computer components, Middle Brook introduced the set of criteria that a system is stable if a Nyquist shape of the product of something like the source impedance Zs and the load permeability Yl lies inside the unit circle in 1976. The volume and phase of the susceptibility are two stability criteria that have been suggested and used in power supply design methodologies [9]. Power processors using Dc Micro Building Blocks (PEBBs). A PEBB is not a particular type of semiconductor, gadget, or circuit topology. We can combine all of these technologies by identifying electrical, mechanical, and thermal components that are common to all of them. Increased power density, "user-friendly" design ("plug and play" power modules), and varied functionalities are goals for power electronic building blocks. Modular propulsions with decreased size, weight, and cost while boosting efficiency are made possible by digital controls working in tandem with high-frequency and extremely resilient circuits [10]. Electronics, control systems, power systems and semiconductor devices. For many students, a power electronics lab can provide an initial hands-on experience in synthesis, which they will need to apply the knowledge in detail throughout their coursework. It is well known that issues such as wiring configuration, circuit layout, and device selection can dominate a converter's performance. Similarly, the study of electrical machines requires practical presentation so that students intuitively learn the concepts of energy flow and energy conversion. Laboratory instruction is of great value as a component of Power Electronics and Electric Machines curriculum [11]. For the past forty years, power electronics have made it possible to convert electrical energy effectively and regulate it in a variety of ways. Yet, the performance of power electronic systems in terms of reliability presents significant hurdles in a variety of emerging applications, particularly for the grid integration of renewable energy with long operational times in severe conditions. The adoption of renewable energy in our modern power grid is a challenge in the long run since the life cycle cost of systems has a considerable impact on levelling energy cost and service quality [12]. Power circuits, a tech that effectively converts electrical energy, play a significant part in wind power systems. To achieve extremely high efficiency in power systems, it is crucial to integrate differential wind power units. Even in fixed-speed turbine systems with wind farms directly attached to the electrical grid, thermosiphons are employed as delicate. Converters for electricity are used to adapt wind turbine features, such as frequency, voltage, active and reactive power regulation, and harmonics, to the needs of phase connections [13].

2. MATERIALS AND METHOD

Analog & Digital Electronics: The usage of continuous time (analogue) signals is a component of analogue electronics. Discrete time communications or two phase signals are used in digital electronics. Passive circuit elements like resistors, capacitors, and others are frequently used in analogue electronics. Nonetheless, active parts like transistors are also employed on occasion. Electronic circuits can be divided into two primary categories: analogue and digital. An analogue

circuit can only handle analogue signals, but a digital circuit can process both analogue and digital signals. This is the main distinction between analogue and digital circuits.

Power Systems: A collection of electrical devices used to provide (produce), transmit, and utilise electricity is referred to as an electric power system. An electrical grid is a system that distributes power to buildings and businesses over a considerable area. There are two varieties of electricity: DC power, which is created by DC sources like generators, batteries, and fuel cells, is defined as the result of voltage and current. AC power is the term for a charge flow that, over time, demonstrates a change in direction.

Electric Circuits: A switch is a route that current can travel. A battery or converter, devices that consume electricity, also including lights, electric motors, or computers, and connecting wires or electrical transmission are all examples of devices that provide energy to charging particles that form an electric current. An electrical circuit is a closed channel made up of wires and electrical parts that uses a difference between two places to allow electricity to flow. A switch is used to link wires, electrical devices, and an electricity source to form an electrical circuit.

Electric Machines: There are motors and generators among electric machinery. A hybrid-electric bus is propelled by motors, which transform electric power into mechanical power. Typically, three common electric machines are found. Let's talk about the efficiency and loss of each machine in turn: the converter, DC machines (motor and generator), and AC businesses (motor and generator). The three primary categories of electric machinery are transformers, generators, and motors. Transformer: The input and output of a transformer are both electrical power. Electric Generator: An electric generator converts mechanical energy into electrical energy.

Digital Controllers: As seen in Figure 1.8, a closed-loop feedback system is controlled by a digital controller. A controller employs filters and algebraic methods for compensation to control, modify, or alter the behaviour of the control algorithm. thermostat-controlled residential heating and cooling systems (temperature sensor). b) The auto's cruise (speed) control. c) A thankless, automatic water heater. d) An automated system for turning on the chamber light at night and turning it off when it's not in use day.

Method: The DEMATEL method addresses a specific issue, pinup binding. Work through problems with a hierarchical structure. Contribute to identifying workable solutions. Structural modeling techniques are used for one reason: interrelationships between organizational components. Dependency identification and context It can affect the basic concept of relationships. and chart direction due to the influence of elements. makes more use of graphs. DEMATEL Based on the basic principle of structure and its visualization, it processes problems by method, analyses them, and solves them. [14]. Modeling this structure, the approach adopts the form of a driven diagram, which is a causal effect for presenting values of influence between interrelated relations and analyzing factors. By analyzing the visual relationship of conditions between systemic factors, all components A causal group and an effect are divided into groups. It also provides researchers with structure between system components. A better understanding of the relationship and complexity is needed for troubleshooting computer problems. can find ways. The DEMATEL system is integrated. Management and emergency response work in tandem. In the manner proposed, it is not necessary to defuzzify obscure numbers before using the DEMATEL method [15]. As a result, it is unclear whether this method will accurately reflect the character. Finally, to get the final results from different aspects Twice in each integrated PPA, we use DEMATEL, which is ours. Decision Testing and Assessment Laboratory (DEMATEL) The DEMATEL method is a powerful method for gathering team knowledge to build a structured model and visualize the causal relationships among subsystems. But crisp values The ambiguity of the real world is an adequate reflection [16]. DEMATEL investigates the relationship between equity and a variety of investment factors and factors, as well as the ANP, which is used to assess their interdependence. Integrates. This section is, first and foremost, detailed. Establishes network relationships before increasing the weight of each ANP factor in comparison to Uses. Third, a systematic data collection process is provided [17]. The DEMATEL method quickly separates the complex set of factors into a sender organization and a receiving institution, and then translates that information into the appropriate strategy for selecting a management tool. Also, the ZOGP model enables businesses to fully utilise their limited funds for planning to develop ideal management systems by combining different configurations with Explicit Priorities [18]. DEMATEL methods. This impact and causality can be attributed to affected group barricades. Therefore, to effectively implement electronic waste management, barriers belonging to a causally Influential subgroup should be given special consideration. Decision-makers must therefore identify hurdles in order to reduce their impact or influence, guarantee that the legal is strong, and ensure that appropriate barriers are in place. Therefore, der methods ISM and DEMATEL methods, the results are somewhat consistent results grated ISM DEMATEL results for e-was determination constraints determine not only the structure of fire but also the structure of the interactions DEMATEL research, specific applications for DEMATEL. as for which DEMATEL is only. categories: factors or only relationships between criteria The first type of clarification is: and causal Group barriers pro or Source for affected group barriers can be considered due. Therefore, in order to effectively implement electronic waste management, barriers belonging to a causal or an influential group should be considered on a priority basis. Therefore, decision makers need to determine obstacles the legal framework is strong make sure there is controllable in order to minimize impact or influence barriers. Therefore, derived from ISM and DEMATEL methods the results are somewhat consistent. The structure of the interactions between these barriers is determined by the integrated ISM DEMATEL results for e-waste management constraints [19]. DEMATEL research, specific applications for DEMATEL. categories: factors or only relationships between criteria The first type of clarification

involves identifying the main factors in terms of causal relationships and interrelationship size, while the second involves identifying the criteria for relationship and impact level analysis. DEMATEL method. As a result, the preliminary disadvantage (cluster one) was about topics such as the comparative weights of selection makers in the DEMATEL approach, which now does not take into account linking to team decision-making [20]. Obviously, in a group decision-making hassle, regular decision-makers can always trust their point of view and count on it to be prevalent among other selection-makers. This way, the very last evaluation guides must be close to their judgments, and if the very last assessment effects are close to their critiques, the choice maker is willing to simply accept it; otherwise, they may deny it. It is believed that methods based on unstructured comparisons, such as DEMATEL, play a significant role in the aforementioned discrepancies [21]. DEMATEL is widely accepted for analyzing the overall relationship of factors and classifying factors into cause-and-effect types. Therefore, this article considers each source as a criterion in decision-making. To deal with a mixture of conflicting evidence, the significance and level of significance of each piece of evidence can be determined using DEMATEL; however, expanding the DEMATEL method with the source theory is required for better conclusions. In this article, instead of the comparative criteria provided by the experts in DEMATEL [22], the corresponding propositions between the bodies of sources are changed. The DEMATEL technique used as well as creating causal relationships between criteria for evaluating the Integrated Multiple Scale Decision Making (MCDM) Outreach Personnel Program integrates DEMATEL and a new cluster-weighted system, in which DEMATEL is a company. The reason for the complexity between the criteria This is to visualize the structure of relationships. It is also used to measure the influence of criteria. Buyukozkan and Ozturkcan integrated ANP and DEMATEL, an innovation in terms of technology. have developed an approach that is for companies. helps determine important Six Sigma Projects and logistics specifically prioritizing these projects helps to identify companies [23].

3. RESULTS AND DISCUSSION

TABLE 1. Power Systems and Power Electronics

	Analog & Digital Electronics	**Power Systems**	**Electric Circuits**	**Electric Machines**	**Digital Controllers**	**Sum**
Analog & Digital Electronics	0	2	4	2	3	11
Power Systems	4	0	2	1	2	9
Electric Circuits	2	1	0	3	1	7
Electric Machines	1	3	2	0	2	8
Digital Controllers	2	4	1	3	0	10

Table 1 shows that DEMATEL Decision making trail and evaluation laboratory in Power Systems and Power Electronics with respect to Analog & Digital Electronics, Power Systems, Electric Circuits, Electric Machines and Digital Controllers sum this value.

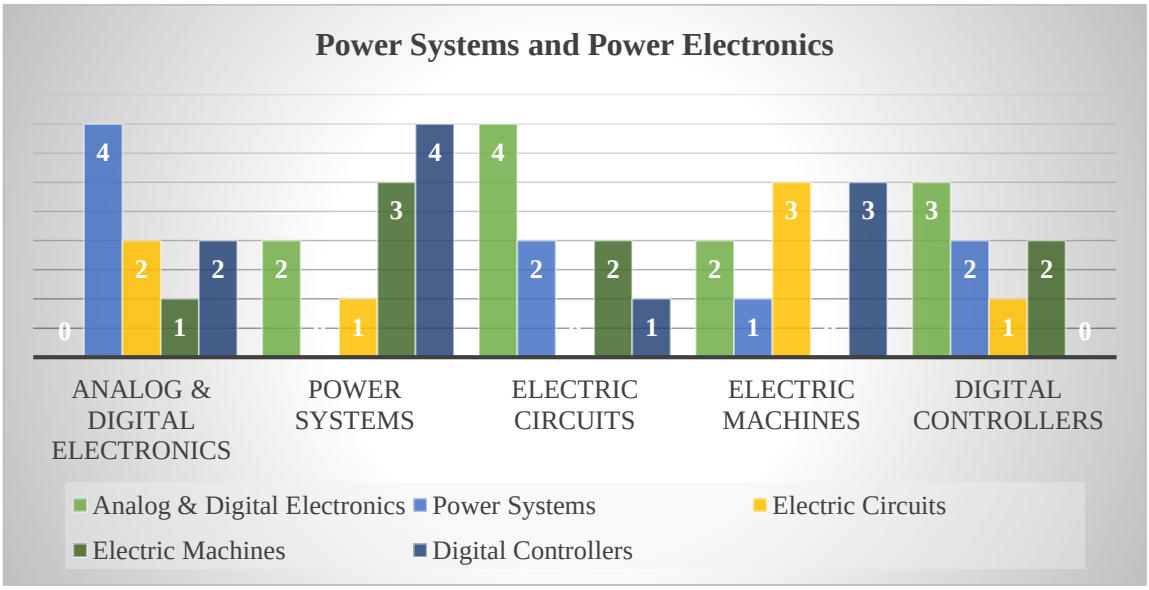

FIGURE 1. Power Systems and Power Electronics

Figure 1 shows that DEMATEL Decision making trail and evaluation laboratory in Power Systems and Power Electronics with respect to Analog & Digital Electronics, Power Systems, Electric Circuits, Electric Machines and Digital Controllers sum this value

TABLE 2. Normalization of direct relation matrix

Normalization of direct relation matrix					
	Analog & Digital Electronics	**Power Systems**	**Electric Circuits**	**Electric Machines**	**Digital Controllers**
Analog & Digital Electronics	0	0.181818182	0.36363636	0.181818182	0.272727273
Power Systems	0.363636364	0	0.18181818	0.090909091	0.181818182
Electric Circuits	0.181818182	0.090909091	0	0.272727273	0.090909091
Electric Machines	0.090909091	0.272727273	0.18181818	0	0.181818182
Digital Controllers	0.181818182	0.363636364	0.09090909	0.272727273	0

Table 2 shows that the Normalizing of the direct relation matrix in Power Electronics in Power Systems, Analog & Digital Electronics, Power Systems, Electric Circuits, Electric Machines and Digital Controllers the diagonal value of all the data set is zero.

TABLE 3. Calculate the Total Relation Matrix

	Analog & Digital Electronics	**Power Systems**	**Electric Circuits**	**Electric Machines**	**Digital Controllers**
Analog & Digital Electronics	0	0.181818182	0.363636364	0.181818182	0.27272727
Power Systems	0.363636364	0	0.181818182	0.090909091	0.18181818
Electric Circuits	0.181818182	0.090909091	0	0.272727273	0.09090909
Electric Machines	0.090909091	0.272727273	0.181818182	0	0.18181818
Digital Controllers	0.181818182	0.363636364	0.090909091	0.272727273	0

Table 3 Shows the Calculate the total relation matrix in Power Systems and Power Electronics with respect to Analog & Digital Electronics, Power Systems, Electric Circuits, Electric Machines and Digital Controllers is Calculate the Value.

TABLE 7. (I-Y)-1 Value

(I-Y)-1				
1.890832	1.100689	1.168345	1.038156	1.010775
1.081081	1.837838	0.963964	0.864865	0.873874
0.749868	0.735559	1.612259	0.81558	0.633104
0.788553	0.952305	0.832538	1.666137	0.766826
1.020138	1.195019	0.936584	1.031797	1.768239

Table 7 shows the (I-Y)-1Value in Power Systems and Power Electronics with respect to Power Electronics in Power Systems, Analog & Digital Electronics, Power Systems, Electric Circuits, Electric Machines and Digital Controllers Table 6 shows the Minvers shows used.

TABLE 8. Total Relation matrix (T)

	Total Relation matrix (T)					**Ri**
	0.890832	1.100689	1.168345	1.038156	1.010775	**5.208797**
	1.081081	0.837838	0.963964	0.864865	0.873874	**4.621622**
	0.749868	0.735559	0.612259	0.81558	0.633104	**3.54637**
	0.788553	0.952305	0.832538	0.666137	0.766826	**4.006359**
	1.020138	1.195019	0.936584	1.031797	0.768239	**4.951775**
Ci	**4.530472**	**4.82141**	**4.51369**	**4.416534**	**4.052818**	

Table 8 shows the Total Relation Matrix (T) the direct relation matrix is multiplied by the inverse of the value that the direct relation matrix is subtracted from the identity matrix.

TABLE 9. Power Systems and Power Electronics Ri & Ci Value

	Ri	**Ci**
Analog & Digital Electronics	5.208797	4.530472
Power Systems	4.621622	4.82141
Electric Circuits	3.54637	4.51369
Electric Machines	4.006359	4.416534
Digital Controllers	4.951775	4.052818

Table 9 shows the Power Systems and Power Electronics Ri, Ci Value Power Electronics in Power Systems, Analog & Digital Electronics, Power Systems, Electric Circuits, Electric Machines and Digital Controllers in Power Electronics in Analog & Digital Electronics is showing the Highest Value for Ri and Electric Circuits is showing the lowest value. Power Electronics in Power Systems is showing the Highest Value for Ci and Digital Controllers is showing the lowest value.

TABLE 10. Calculation of Ri+Ci and Ri-Ci to Get the Cause and Effect

	Ri+Ci	Ri-Ci	Rank	Identity
Analog & Digital Electronics	9.739269	0.678325	1	cause
Power Systems	9.443031	-0.19979	2	effect
Electric Circuits	8.06006	-0.96732	5	effect
Electric Machines	8.422893	-0.41017	4	effect
Digital Controllers	9.004593	0.898958	3	cause

Table 10 shows the Calculation of Ri+Ci and Ri-Ci to Get the Cause and Effect. Power Electronics in Power Systems, Analog & Digital Electronics, Power Systems, Electric Circuits, Electric Machines and Digital Controllers of Analog & Digital Electronics and Digital Controllers is Showing the highest Value of cause. Power Electronics in Power Systems, Electric Circuits and Electric Machines is showing the lowest Value of effect.

TABLE 11. T matrix value

T matrix				
0.890832	**1.100689**	**1.168345**	**1.038156**	**1.010775**
1.081081	0.837838	**0.963964**	0.864865	0.873874
0.749868	0.735559	0.612259	0.81558	0.633104
0.788553	**0.952305**	0.832538	0.666137	0.766826
1.020138	**1.195019**	**0.936584**	**1.031797**	0.768239

Table 11. Shows the T matrix calculate the average of the matrix and its threshold value (alpha) **Alpha 0.893396926** If the T matrix value is greater than threshold value then bold it

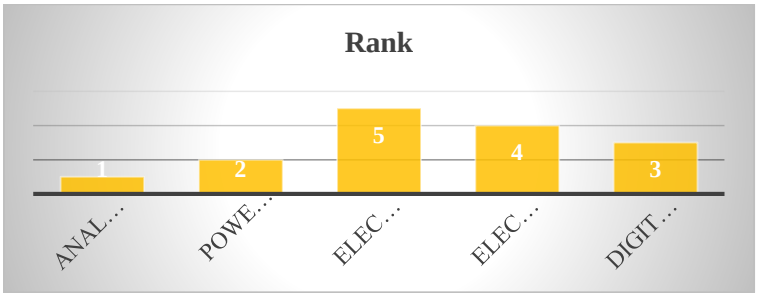

FIGURE 6. Shown the Rank

Figure 6 shows the Rank using the DEMATEL for Power Systems and Power Electronics in Analog & Digital Electronics is got the first rank whereas is the Electric Circuits is having the Lowest rank.

4. CONCLUSION

Focus is placed on all aspects of electrical energy as well as innovation in energy generation and delivery, three different approaches, and efficient technologies in energy and energy systems research. Research projects focus on systems and equipment for converting, supplying, and using energy as a form of electricity. In order to improve quality and efficiency and to promote the gradual materialization of intelligent, efficient energy, power electronics are increasingly a more fundamental component of power systems. In general, issues like service disruptions and power outages are related to the reliability of the power supply. It is commonly stated that this is an attempt to rely on codes that are directly pertinent to the user. Standard dependency index values for US purposes include SAIFI, SAIDI, and CAIDI. Power electronics-based power systems are propelled by the widespread use of electronic power conversions for applications including renewable energy generation and energy storage. A multi-time level control scheme that adjusts the current for the stability and quality of the electricity system is typically included in power converters. Electromagnetic interfaces of electrical machines and electrical networks. The usage of continuous time (analogue) signals is a component of analogue electronics. Discrete time communications or two phase signals are used in digital electronics. Passive circuit elements like resistors, capacitors, and others are frequently used in analogue electronics A collection of electrical devices used to provide (produce), transmit, and utilise electricity is referred to as an electric power system. An electrical grid is a system that distributes power to buildings and businesses over a considerable area. There are two varieties of electricity. A switch is a route that current

can travel. A battery or converter, devices that consume electricity, also including lights, electric motors, or computers, and connecting wires or electrical transmission are all examples of devices that provide energy to charging particles that form an electric current. There are motors and generators among electric machinery. A hybrid-electric bus is propelled by motors, which transform electric power into mechanical power. Typically, three common electric machines are found. Let's talk about the efficiency and loss of each machine as seen in Figure 1.8, a closed-loop feedback system is controlled by a digital controller. A controller employs filters and algebraic methods for compensation to control, modify, or alter the behavior of the control algorithm. DEMATEL (Decision Making Trial and Evaluation Laboratory) They are divided into analysis using the Nonmetal mineral product industry, General equipment manufacturing, Mining and washing of coal, Textile industry, Food manufacturing industry It is the interaction between the factors Visualized and assesses dependent relationships Through the structural model Also deals with identifying important. Analog & Digital Electronics, Power Systems, Electric Circuits, Electric Machines and Digital Controllers. Power Systems and Power Electronics in Analog & Digital Electronics is got the first rank whereas is the Electric Circuits is having the Lowest rank.

REFERENCES

[1]. Wang, Xiongfei, and Frede Blaabjerg. "Harmonic stability in power electronic-based power systems: Concept, modeling, and analysis." *IEEE Transactions on Smart Grid* 10, no. 3 (2018): 2858-2870.

[2]. Wen, Bo, Rolando Burgos, Dushan Boroyevich, Paolo Mattavelli, and Zhiyu Shen. "AC stability analysis and dq frame impedance specifications in power-electronics-based distributed power systems." *IEEE Journal of Emerging and Selected Topics in Power Electronics* 5, no. 4 (2017): 1455-1465.

[3]. Zhong, Qing-Chang. "Power-electronics-enabled autonomous power systems: Architecture and technical routes." *IEEE Transactions on Industrial Electronics* 64, no. 7 (2017): 5907-5918.

[4]. Sybille, Gilbert, and Hoang Le-Huy. "Digital simulation of power systems and power electronics using the MATLAB/Simulink Power System Blockset." In *2000 IEEE Power Engineering Society Winter Meeting. Conference Proceedings (Cat. No. 00CH37077)*, vol. 4, pp. 2973-2981. IEEE, 2000.

[5]. Hingorani, Narain G. "Power electronics in electric utilities: role of power electronics in future power systems." *Proceedings of the IEEE* 76, no. 4 (1988): 481-482.

[6]. Blaabjerg, Frede, Zhe Chen, and Soeren Baekhoej Kjaer. "Power electronics as efficient interface in dispersed power generation systems." *IEEE transactions on power electronics* 19, no. 5 (2004): 1184-1194.

[7]. Rahimi, Amir M., and Ali Emadi. "An analytical investigation of DC/DC power electronic converters with constant power loads in vehicular power systems." *IEEE Transactions on vehicular technology* 58, no. 6 (2008): 2689-2702.

[8]. Wang, Xiongfei, Frede Blaabjerg, and Weimin Wu. "Modeling and analysis of harmonic stability in an AC power-electronics-based power system." *IEEE transactions on power electronics* 29, no. 12 (2014): 6421-6432.

[9]. Huang, Jing, Keith A. Corzine, and Mohamed Belkhayat. "Small-signal impedance measurement of power-electronics-based AC power systems using line-to-line current injection." *IEEE Transactions on Power Electronics* 24, no. 2 (2009): 445-455.

[10]. Ericsen, T., and A. Tucker. "Power Electronics Building Blocks and potential power modulator applications." In *Conference Record of the Twenty-Third International Power Modulator Symposium (Cat. No. 98CH36133)*, pp. 12-15. IEEE, 1998.

[11]. Balog, Robert S., Zakdy Sorchini, Jonathan W. Kimball, Patrick L. Chapman, and Philip T. Krein. "Modern laboratory-based education for power electronics and electric machines." *IEEE Transactions on Power Systems* 20, no. 2 (2005): 538-547.

[12]. Yang, Yongheng, Huai Wang, Ariya Sangwongwanich, and Frede Blaabjerg. "Design for reliability of power electronic systems." In *Power electronics handbook*, pp. 1423-1440. Butterworth-Heinemann, 2018.

[13]. Chen, Zhe, Josep M. Guerrero, and Frede Blaabjerg. "A review of the state of the art of power electronics for wind turbines." *IEEE Transactions on power electronics* 24, no. 8 (2009): 1859-1875.

[14]. Lin, Ru-Jen. "Using fuzzy DEMATEL to evaluate the green supply chain management practices." Journal of cleaner production 40 (2013): 32-39.

[15]. Li, Ya, Yong Hu, Xiaoge Zhang, Yong Deng, and SankaranMahadevan. "An evidential DEMATEL method to identify critical success factors in emergency management." Applied Soft Computing 22 (2014): 504-510.

[16]. Wu, Wei-Wen, and Yu-Ting Lee. "Developing global managers' competencies using the fuzzy DEMATEL method." Expert systems with applications 32, no. 2 (2007): 499-507.

[17]. Lee, Wen-Shiung, Alex YiHou Huang, Yong-Yang Chang, and Chiao-Ming Cheng. "Analysis of decision making factors for equity investment by DEMATEL and Analytic Network Process." Expert Systems with Applications 38, no. 7 (2011): 8375-8383.

[18]. Tsai, Wen-Hsien, and Wen-Chin Chou. "Selecting management systems for sustainable development in SMEs: A novel hybrid model based on DEMATEL, ANP, and ZOGP." Expert systems with applications 36, no. 2 (2009): 1444-1458.

[19]. Kumar, Ashwani, and Gaurav Dixit. "An analysis of barriers affecting the implementation of e-waste management practices in India: A novel ISM-DEMATEL approach." Sustainable Production and Consumption 14 (2018): 36-52.

[20]. Si, Sheng-Li, Xiao-Yue You, Hu-Chen Liu, and Ping Zhang. "DEMATEL technique: A systematic review of the state-of-the-art literature on methodologies and applications." Mathematical Problems in Engineering 2018 (2018).

[21]. Yazdi, Mohammad, Faisal Khan, RouzbehAbbassi, and RiszaRusli. "Improved DEMATEL methodology for effective safety management decision-making." Safety science 127 (2020): 104705.

[22]. Zhang, Weiquan, and Yong Deng. "Combining conflicting evidence using the DEMATEL method." Soft computing 23, no. 17 (2019): 8207-8216.
[23]. Lee, Hsuan-Shih, Gwo-HshiungTzeng, WeichungYeih, Yu-Jie Wang, and Shing-Chih Yang. "Revised DEMATEL: resolving the infeasibility of DEMATEL." Applied Mathematical Modelling 37, no. 10-11
[24]. Chang, Chia-Ling. "A modified VIKOR method for multiple criteria analysis." Environmental monitoring and assessment 168 (2010): 339-344.
[25]. Radtke, F. K. F., A. Simone, and L. J. Sluys. "A computational model for failure analysis of fibre reinforced concrete with discrete treatment of fibres." Engineering fracture mechanics 77, no. 4 (2010): 597-620.
[26]. Wu, Heyang, Xiaoshan Lin, and Annan Zhou. "A review of mechanical properties of fibre reinforced concrete at elevated temperatures." Cement and Concrete Research 135 (2020): 106117.
[27]. Lee, M. K., and B. I. G. Barr. "An overview of the fatigue behaviour of plain and fibre reinforced concrete." Cement and Concrete Composites 26, no. 4 (2004): 299-305.
[28]. Barnett, Stephanie J., Jean-Francois Lataste, Tony Parry, Steve G. Millard, and Marios N. Soutsos. "Assessment of fibre orientation in ultra high-performance fibre reinforced concrete and its effect on flexural strength." Materials and Structures 43 (2010): 1009-1023.
[29]. Saidani, Messaoud, Danah Saraireh, and Michael Gerges. "Behaviour of different types of fibre reinforced concrete without admixture." Engineering Structures 113 (2016): 328-334.
[30]. Madhusudhan Dasari sreeramulu, “Analysis of Wireless Security and Networks using COPRAS Method” REST Journal on Data Analytics and Artificial Intelligence 2(4), December 2023, 32-41.
[31]. Neha Bharani, “Blockchain Technology and Its Role in the Bitcoin Ecosystem A Review” International Journal of Novel Research and Development, 2023.
[32]. Madhusudhan Dasari sreeramulu, “Optimizing Cloud Computing Networks in Information Security Controls using COPRAS Method”, Computer Science, Engineering and Technology 1(2), 2023, 42-54.
[33]. Inaganti Rambabu, Yalavarthy Sreekanth, “FUSING CYBERSECURITY, AI, AND EMERGING TECHNOLOGIES IN MEDICAL DEVICES FOR IMPROVED HEALTHCARE” INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS, 10(4), 2023, 74-81.
[34]. Verma, Pradeep. "Effective Execution of Mergers and Acquisitions for IT Supply Chain." International Journal of Computer Trends and Technology 70, no. 7 (2022): 8-10.
[35]. Krishnamaneni, Mr Ramesh, and A. N. Murthy. "Advancing Drug Dealing Detection Using Neural Embedding and Nearest Neighbour Searching Techniques." International Journal on Recent and Innovation Trends in Computing and Communication 9, no. 7 (2021): 19-23.
[36]. Inaganti Rambabu, Yalavarthy Sreekanth, “Innovative Solutions: AI-Enabled Medical Devices and Digital Twin Technology Shaping Future Healthcare”, INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS, 11(12), 2023, e497-e506.
[37]. Logeshwaran, J., Venkata Ashok K. Gorantla, Venkataramaiah Gude, and Bhargavi Gorantla. "The Smart Performance Analysis of Cyber Security Issues in Crypto Currency Using Blockchain." In 2023 6th International Conference on Contemporary Computing and Informatics (IC3I), vol. 6, pp. 2235-2241. IEEE, 2023.
[38]. Verma, Pradeep. "Sales of Medical Devices–SAP Supply Chain." International Journal of Computer Trends and Technology 70, no. 9 (2022): 6-12.
[39]. Jaganathan Rajamanickam, M. Ramachandran, Ramya sharma, Chinnasami Sivaji, "Distributed Generation (DG) system using COPRAS method", REST Journal on Advances in Mechanical Engineering, 2(3) September 2023, 11-22.
[40]. Bharani, Neha. Complexity study of software engineering phases and software quality. Book Rivers, 2022.
[41]. Senthil Kumar Sadasivam Baby Jooju , Sheela Thangaraj, “Degradation Potential of Scedosporium apiospermum SKF2 against an Azo Dye, Reactive Red 180 and Its Phytotoxicity Evaluation”, Applied Ecology and Environmental Sciences, 10 (6), 2022, 388-393.
[42]. Dr. N. subash, M. Ramachandran, Vimala Saravanan, Vidhya prasanth,, “An Investigation on Tabu Search Algorithms Optimization”, Electrical and Automation Engineering 1(1) 2022, 13-20.
[43]. Madhusudhan Dasari sreeramulu, “Sensitive Analysis of Natural Language Processing Using for MOORA Method”, Computer Science, Engineering and Technology, 1(1), March 2023, 46-53.
[44]. hya Prasanth; Manjula Selvam, “Investigation of Various Solar Photovoltaic Cells and its limitation”, Renewable and Nonrenewable Energy, 1(1), 2022, 22-29.
[45]. Krishnamaneni, Ramesh, A. N. Murthy, and S. Sen. "A comparative study of big data mining algorithms for early detection of heart attack risk factors in electronic medical records." International Journal of Computer Engineering and Technology (IJCET) 10, no. 6 (2019): 139-154.
[46]. Sreenath Devineni, Bhargavi Gorantla, “Energy-Efficient Computing and Green Computing Techniques”, Computer Science, Engineering and Technology, 1(4), 2023, 37-45.
[47]. Thangaraj, Sheela, Paul Olusegun Bankole, Senthil Kumar Sadasivam, and Varuna Kumarvel. "Biodegradation of Reactive Red 198 by textile effluent adapted microbial strains." Archives of Microbiology 204, no. 1 (2022): 12.
[48]. Sreenath Devineni, Bhargavi Gorantla, “Security and Privacy Issues in Internet of Things (IoT) Devices Using COPRAS Method” REST Journal on Data Analytics and Artificial Intelligence, 2(4), 2023, 15-22.

