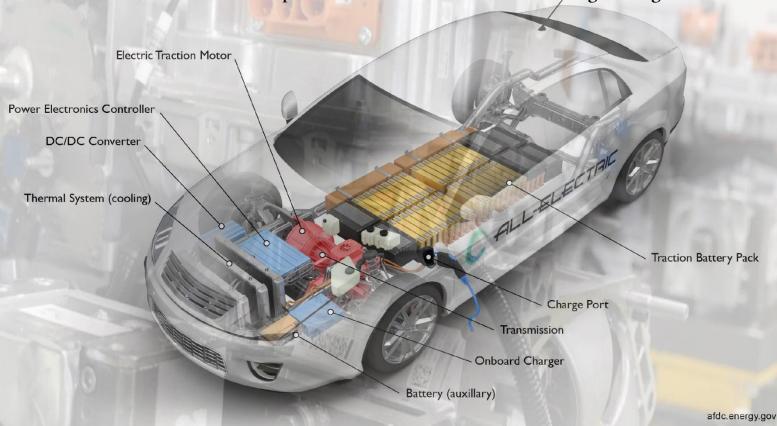


MDYUT

DEC 2022

All-Electric Vehicle

The Official Newsletter of Department of Electrical and Electronics Engineering at SVCE



Top Picks

POWER FACTOR

Trends In Electrical Industries You Must know

Electric vehicles Motors (EV Motors)



CONTENT

S.No	TITLE
1	Motors in Electric Vehicles
2	Achievements and Awards Received by the Faculty Members
3	Achievements and Award Received by the Student
4	Participation in FDP / Workshops
5	Power Factor
100	EL PROPERTIES
	ANDELL

MOTORS IN ELECTRIC VEHICLES

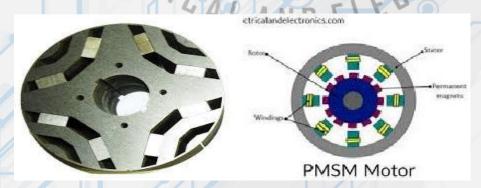
Electric vehicles Motors (EV Motors) have the potential for creating emission-free solutions for the rising mega cities. Increased urbanization, traffic congestion, poor air quality and lack of mobility options call for affordable and clean transportation alternatives. Modification to the conventional electrical machines led to the special electric machines which are more suitable for Electric Vehicles. The BLDC, PMSM, IPM-SynRM, axial flux motor used in today's EVs enable greater power efficiency, smaller size, lighter weight, and lower cost solutions.

Due to an extremely simple configuration both their functioning and handling are easy to understand. PM-assisted synchronous reluctance machines (PMa-SynRMs) reduce the use of rare-earth PMs in traction machines. Unconventional motors like flux switching motors (FSMs) and many variants of axial flux motors are other possible candidates of research for the traction application.

Advantages of such EV motors are,

- **↓** effective torque−speed characteristics
- **↓** robust construction
- high power density and efficiency

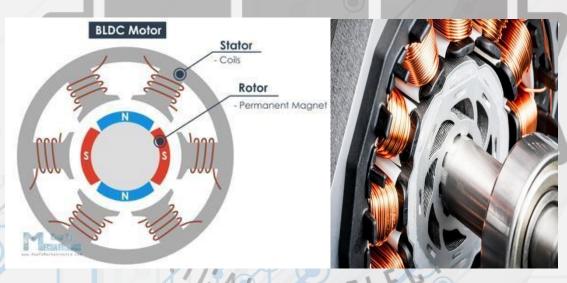
PMSM



Axial flux motor



BLDC

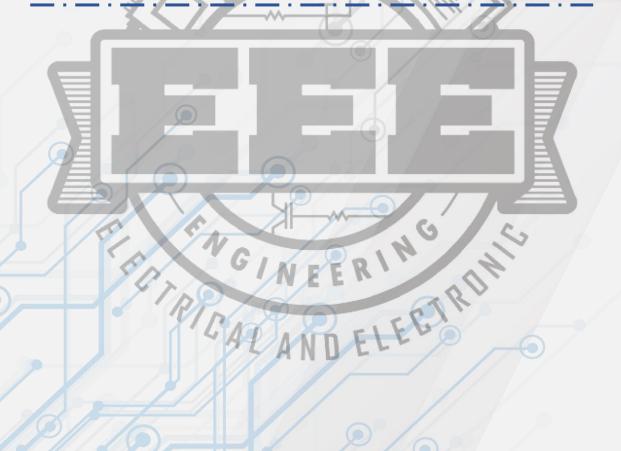


IPM SYN-RM





- **TATA Motors**
- 4 Ashok Leyland
- **♣** Ola
- **♣** Hero Electric
- **4** Ather Energy
- **♣** Okinawa
- **♣** Revolt Motors



SRI VENKATESWARA COLLEGE OF ENGINEERING DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

ACHIEVEMENTS AND AWARDS BY THE FACULTY MEMBERS

♣ Dr.M.Sankar AP/EEE

Recipient of SVCE - Best Teacher Award (2021-2022)



It is a privilege to share my perspective,

In our education system, children or youngsters dwell in school or colleges quantitatively six hours a day. The time they spend with their teachers or professors is more than that they spend with their parents. In this context, teachers or professors have the prime responsibility of making young minds explore their field of interest, build strong fundamental knowledge and expertise in the same. Apart from making them expertise in their field of interest, the teachers or professors also have another important responsibility of building human values inevery young mind.

To make an individual expertise in their field of interest, the teacher or professor should be very strong and up to date in their subject. They should create interest in students to analyze problem statements and provide innovative solutions. Thereby the students inculcate traits of giving optimal solutions to the society. To develop human values in students, teachers or professors should sacrifice a lot and live an honest life as students admire them as their role models many a times.

I recollect the saying of Dr. A.P.J. Abdul Kalam, because no human being on earth can have thought of molding the young minds as him:

"My message, especially to young people is to have the courage to think differently, courage to invent, to travel the unexplored path, courage to discover the impossible and to conquer the problems and succeed. These are great qualities that they must work towards. This is my message to young people."

When a 7th standard student posed a question to him "What is the weakness of India?"

He answered "Corruption" and also gave a solution to eradicate it:

"Every young mind should strongly deny the luxuries derived of bribe from their parents".

Dr. Kamal, AP/EEE/SVCE submitted a project proposal to the Central Power Research institute (CPRI), Ministry of Power, Government of India, Bangalore under the Research Scheme on Power (RSoP), titled as "Design of Deep Recurrent Neural Network Based MediumTerm Load Forecasting with Clustering Based Hybrid Feature Selection in association with Rajiv Gandhi National institute of Youth development, Ministry of Youth Affairs & Sports, Government of India, Sriperumbudur.

Dr. Kamal, AP/EEE/SVCE acted as session chair in the IEEE (Madras section technically) sponsored First International Conference on Computer, Power and Communication held at Sri Sairam institute of technology Chennai from 14-16th December, 2022.





Dr. Venkatesh RJ, AP/EEE, was conferred with the International Teacher of the Year award by the Global Edu-Conclave 2022 held virtually on 25 December 2022, organised by International Institute of Organized Research - I2OR and Green ThinkerZ in association with Centre for Smart Modern Construction, Western Sydney University, Australia, Prof. G.D. Agrawal Centre for Scientific Development and Environment Advocacy, The Intelligent Indian, Sustainable Cosmos, Wakelet, IJRECE, TRJ, SusCos Academy, Elsevier's Mendeley.



SPECIAL ACCOMPLISHMENT

Mrs. Akila S successfully completed a 5-day course on the theme "Inculcating Universal Human Values in Technical Education Technical Education" organized by AICTE from December 19th -23rd, 2022



JOURNAL PUBLICATIONS

* R. Karthikeyan, K. Vijayakumar, G. Premsunder, A.J. Basanth, "A Soft Magnetic Composite Blank for Switched Reluctance Motor: Vibration and Acoustic Noise Study," 2022 Journal of Vibration Engineering & Technologies, doi:10.1007/s42417-022-00718-2.

Purpose:

This paper presents a contemporary direction on the reduction of vibration and acoustic noise in Switched Reluctance Motor (SRM) using Soft Magnetic Composite (SMC) blank.

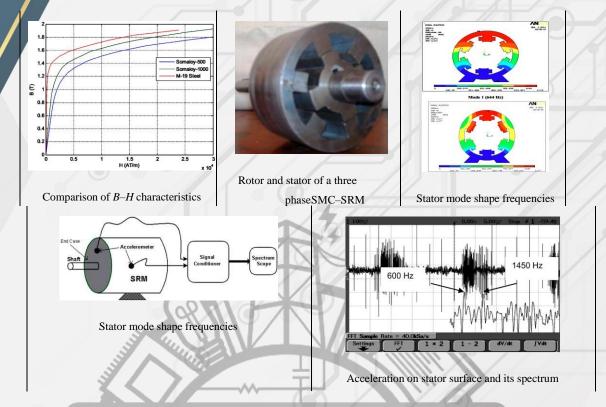


Methods:

Soft magnetic composite materials are composed of iron powder and resin. The particles are compacted, together with a lubricant and possibly a binder, at high pressure into a bulk material. Soft magnetic composite materials are characterized by three-dimensional isotropic ferromagnetic behaviour and very low eddy current loss. The competence of Soft Magnetic Composite (SMC) material in Switched Reluctance Motor (SRM) on vibration related issues has been investigated through Finite Element Analysis and experimentation.

Results:

To analyze the magnetic, vibration, and acoustic noise characteristics two motor configurations, viz., M19-SRM (M19- Switched Reluctance Motor) and SMC- SRM (Soft Magnetic Composite - Switched Reluctance Motor) are considered. The key results are shown below.



Conclusion:

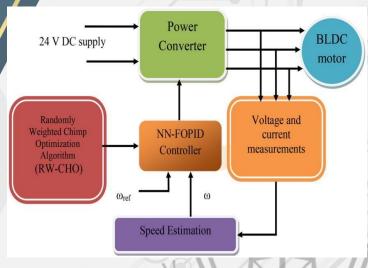
The efficacy of SMC–SRM (Soft Magnetic Composite - Switched Reluctance Motor) prototype in vibration mitigation has been validated.

* Dr. K. R. Santha and D. S. Purushothaman, "Artificial Neural Network with Optimized FOPID for Speed Control of Sensorless BLDC Motor Drive," Journal of Cybernetics and Systems, pp. 1-23, doi.org/10.1080/01969722.2022.214892.

Purpose

At present, Brushless Direct Current (BLDC) motors are frequently used owing to its features such as fast dynamic response, speedy and elevated efficiency, reliability, durable and noise free operation and reduced electromagnetic interference (EMI). This work proposes the speed control of Sensorless BLDC motor for industrial/Domestic applications.

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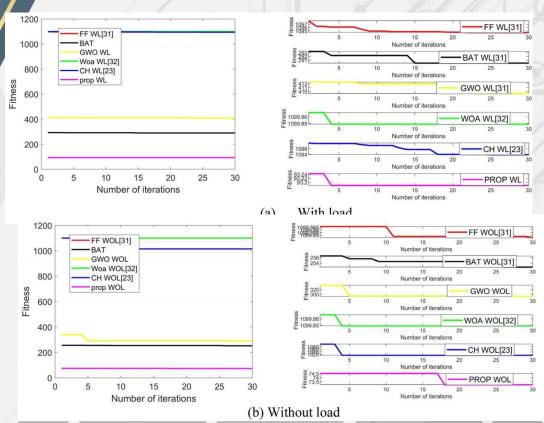
Block Diagram

Methods

This work proposes an Artificial Neural Network (ANN) with optimized Fractional-order Proportional Integral Derivative (ANN-FOPID) controller in which the artificial neural networks are a better way to recognize patterns from the sample of the system that is going to be controlled. Particularly, the gain of FOPIDcontroller (KP, KI, KD, λ , μ) will be optimally tuned by a Random Weighted Chimp Optimization Algorithm (RW-CHO) which is the conceptual improvement of classical Chimp Optimization Algorithm (ChOA). As a result, the sensorless BLDC motor drive provides better rotor speed control and speed control accuracy. ING

Stability Analysis with Load

The proposed method's stability analysis for attaining the desired speed control using optimal ANN-FOPID controller with the RW-CHO method was assessed here. In this case, responses such as "rise time, settling time, settling minimum, settling maximum, overshoot undershoot, peak and peak time" were attained under load condition as presented. Moreover, the computed time response should be as low as possible, and RW-CHO proves that the proposed model is superior. The key results are shown in the figures below.



Convergence analysis of proposed method over the traditional methods (a) with load (b) without load.

Conclusion

A novel Artificial Neural Network with optimized Fractionalorder Proportional Integral Derivative (ANN-FOPID) controller for sensorless speed control of BLDC motor is developed. The gain parameters of the FOPID controller were optimized with the help of a novel meta-heuristic algorithm known as the Random Weighted Chimp Optimization (RWCHO) algorithm. Thus, the simulation results, shows that the ANN based FOPID controller has improved performance and good controllability than existing PID, FF, WOA and CH models

♣ Dr. R.J Venkatesh, N.Juliet , Dr. A. Nalini, Dr E. Sheeba Percis, "IoT-Enabled Cyber Physical Systems detection approaches and distribution of cyber-attacks," 2022 International Journal of Neuro Quantology, Vol. 20, Issue 9, pp. 4139-4145, doi:

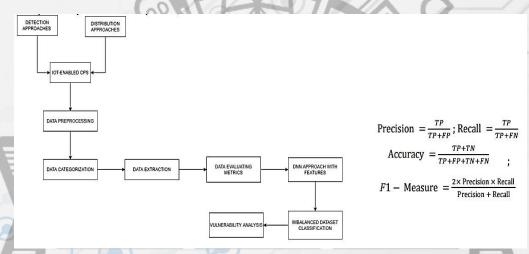


10.14704/nq.2022.20.9.NQ44474. (SJR = 0.29, ISSN : 1303 – 5150).

Purpose

Internet of Things has led to a major surge in sensor networks, green infrastructure, including Industry 4.0, that all perform complicated data analysis of personally identifiable information that will be safeguarded against cybersecurity assaults. Advances in the field, including such smart buildings, medicine,

electricity, farming, robotics, and heavy industries, have seen an upsurge in cybersecurity assaults.



Proposed IoT-enabled cyber-physical systems (CPS) can always be a problem because authentication mechanisms designed for standard information / operational technology systems do not succeed in CPS environments. As a result, the study adopted a cyber-intensive detection mechanism and identification method using CPS with an emphasis on control systems. These proposed attack detection and identification systems provide the basis for maintaining the security of CPS IoT systems

CONFERENCE PUBLICATIONS

* Dr. Sudhakar K B, Ms. Anitha S, Mr.M.Ranjith Kumar, "Modeling and Simulation of a Si/ZnO based Heterojunction Photodetector," International Conference on Recent Advances in Materials and Manufacturing (ICRAMM 2022), Velalar College of Engineering and

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Technology, 8th December, 2022.

- * Dr. Sudhakar K B, Sasikala M, Rishi Kumar D, Yuvakishore K, Vignesh P, "Modeling and Simulation of Ga2O3 Thin Film Solar Blind UV Photodetector," International Conference on Recent Advances in Materials and Manufacturing (ICRAMM 2022), Velalar College of Engineering and Technology, 8th December, 2022.
- ♣ Dr. Bharathi Dasan SG, Dr. Sankar M and Mr. Aakash S, "Adaptive Distance Protection for Smart Grids with In-feed Compensation using Synchronized Phasor Measurements," 2022 International Conference on Smart Generation Computing, Communication and Networking (SMART GENCON) IEEE Bangalore section, 23rd to 25th December, 2022.
- ♣ Dr. Sundararaman K, Dr. Sethuraman S S and Mrs. Suganthi K, "A TopologyReview of LED Drivers without Electrolytic Capacitors" IEEE International Conference Power and Renewable Energy Conference (IPRECON), IEEE student branch, College of Engineering, Karunagappally, 16th-18th December, 2022.

ACHIEVEMENTS AND AWARD BY THE STUDENT

♣ Mr. Srinivasan Vijayaraghavan of II-year EEE, won first place in the ATHENS OF THE EAST, 2nd international Grand Master Open Chess Tournament 2022- Category B at Hotel Thangan Grand Madurai and has received a prize amount of Rs. 60,000/-



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IIT-M ADVANCED CERTIFICATION PROGRAM

* Motivated by the expert talk given by IIT Madras Director, V. KAMAKOTI, Alumnus of SVCE, five students from third year EEE have registered for a course titled "Hybrid and Electric Vehicle Engineering". This course is an advanced certification program provided by Ansys, CADFEM and IIT-M Pravarthak. It is a6 months course (300 hours) which also includes a capstone project. It is funded by the Department of Science and Technology, Government of India, under its National Mission on Interdisciplinary Cyber-Physical Systems, and hosted as a Technology Innovation Hub (TIH) by IIT Madras. The NM-ICPS is acomprehensive Mission aimed at complete convergence with all stakeholders by establishing strong linkages between academia, industry, Government, and International Organizations.

List of students registered for the course are as follows,

- > Bharathwaj.P
- Deepak.H
- Guhan Sanjeevi V
- Karthick Ramanan S P

PARTICIPATION IN FDPs / WORKSHOPS

- ♣ Mr. Karthikeyan V participated in a faculty development program on "Electrical Vehicle Technologies-A Future Transportation Tool" at Bangalore Institute of Technology from 28-11-2022 to 02-12-2022.
- ♣ Mr. Karthikeyan V participated in a faculty development program on Hybrid Electrical Vehicle Technology-Basics at Toyota Kirloskar Motor Pvt. Ltd. on December 8, 2022.
- ♣ **Dr. Kamal C** participated in a Two week ATAL FDP on "Electric Vehicle-Research Challenges and Opportunities" at MIT Campus Anna University, Chennai from December 5th-16th, 2022.
- * Ms. Anitha S participated in the faculty development program on "Creative methods and tools for effective research dissemination", HITDM, Kancheepuram December 10-12, 2022.
- ♣ Mrs. Akila S participated in a faculty development program on "Disaster Awareness Programme" at Sri Venkateswara College of Engineering 17th December, 2022.
- ♣ Mrs. Suganthi K & Mr. Bharadwaj S participated in a faculty development program on "PLC and Automation" at Sri Venkateswara College Of Engineering, December 27-28, 2022.

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POWER FACTOR

Power factor is the measure of how effectively the incoming power isused in an electrical system. A high power factor indicates that the power supplied to the electrical system is effectively used. A system with low power factor doesn't effectively consume the incoming electric supply and results in losses. There is no power factor involved in DC circuits due to zero frequency. But, in AC circuits, the value of power factor always lies between 0 and 1.

What is Power factor?

Power factor is defined as the cosine of the angle between voltage and current .ideally. In Ac circuits the phase difference between voltage and current is zero

Power factor Correction

The power factor correction can be done by two methods

- Capacitor method
- Synchronous condenser method

DID YOU KNOW???????

Poor Power Factor problem of affecting the device?

Yes. Because we ultimately, are used inductive type of load cause the poor power factor. it may reduce the life time of device and draw more power consumes

To used quality of power used to improve the improved life time ofdevice and save more power.....

Fact for life

A satisfied life is better than a successful life. Because, success is measured by others. But our satisfaction is measured by our own Soul, mind and heart



NEWSLETTER

EDITORIAL TEAM

Dr. KR. Santha, Vice Principal & HOD/EEE
Dr. Sudhakar K Bharathan, AHOD/EEE
Dr. R. Karthikeyan, ASP/EEE
Ms. S .Sinthamani, Asst Professor/EEE
Mr. Bharadwaj, Asst Professor/EEE

Mr. Sabari & Ms. Harini, III year/EEE