Curriculum vitae
Marco Faifer

Contents

1. Biographical notes

- Marco Faifer received his M.Sc. degree in Electronic Engineering from the Politecnico di Milano in 2004 with the thesis: "Sensore di campi elettrici e magnetici per applicazioni su robot navigatori" (Electric and magnetic fields sensor for applications with navigator robots).

- In April 2009, he received the PhD degree in Electrical Engineering from the Politecnico di Milano with the thesis " Metodi e sistemi innovativi di misura e di diagnostica per apparati elettrici in alta tensione" (Innovative methods and measurement systems for the diagnostics of high voltage equipment).

- From 01/07/04 to 31/03/05 he was temporary research fellow at the Department of Electrical Engineering of the Politecnico di Milano. He worked on a project funded by Passoni Villa s.p.a. entitled "Design and development of the electronic section of a combined voltage and current measurement transformer for high-voltage system compliant with IEC 60044 -7 and IEC 60044-8".

- From 01/04/05 to 01/12/08 he was temporary research fellow at the Department of Electrical Engineering of the Politecnico di Milano, and he worked in the research program entitled "Advanced technologies for the design and metrological characterization of sensors for environmental monitoring ".

- On 1st December 2008 he joined the Faculty of Engineering of Industrial Processes at the Politecnico di Milano as assistant professor in the scientific sector ING-INF/07 - Electrical and Electronic Measurements.

- In February 2012 he was confirmed in the role as assistant professor in Electrical and Electronic Measurements.

- From January 2013 he is with the Dipartimento di Elettronica, Informazione e Bioingegneria (DEIB) of Politecnico di Milano.

- Since October 2017 he is associate professor in Electrical and Electronic Measurements at Politecnico di Milano.

- In 2017 he got the "Abilitazione scientifica Nazionale" I Fascia (Full Professor).

- He is co-author of 34 scientific papers published on international journals, 2 scientific papers published on national journals and more than 90 scientific papers published on the proceedings of national and international conferences and of a chapter of book on "Electric Power and Energy Measurement".

- Since 2004 he has held lab classes for several courses in the field of electrical and electronic measurements at the Politecnico di Milano.

- From academic year 2012-2013 he has taught the course "Measurement and diagnostic techniques" of the Master of Science degree in Electrical Engineering at the Politecnico di Milano.

- Since 2004 he is member of IEEE and Instrumentation and Measurement Society of IEEE.

- Since 2017 he is Senior member of IEEE and Instrumentation and Measurement Society of IEEE.
- He is member of GMEE.
- He is a reviewer of the journal "IEEE Transactions on Instrumentation and Measurement" and "IEEE Transactions on Power Delivery", "Measurement".
- In 2011 he was awarded as "Outstanding Reviewers of 2011" by the IEEE Instrumentation and Measurement Society.
- He has been member of the technical program committees of the IEEE conferences I2MTC13-I2MTC17, AMPS10, SSD11, PECON12, ISIEA12, SSD12, and ISGT14.
- Since 2016 he has been member of the technical program committee IMEKO TC10.
- Since 2013 he has been member of the steering committee of the conference IEEE ICCEP.
- In 2010 and 2011 he organized a special section for the conference IEEE I2MTC.
- From 2013 to 2017, he was member of the scientific panel of the PhD course in Electrical Engineering at Politecnico di Milano.

2. Teaching activities

- In the academic year (A.Y.) 2004-2005 Dr. Faifer held the laboratory classes of "Principles of Electrical Engineering", for the B. Sc. degree in Management Engineering, at Politecnico di Milano.
- From A.Y. 2004-2005 to A.Y.2009-2010 Dr. Faifer held the laboratory classes of "Electrical Measurement I and Measurement Instrumentation I", for the B.Sc. in Electrical Engineering, at Politecnico di Milano.
- From A.Y. 2004-2005 to A.Y. 2008-2009 Dr. Faifer held the laboratory classes of "Process Instrumentation II" for the M.Sc. in Electrical Engineering, at Politecnico di Milano.
- From A.Y. 2007-2008 to A.Y. 2009-2010 Dr. Faifer held the laboratory classes of "Electrical Measurement II + Digital Signal Processing Measurement Signals" for the M.Sc in Electrical Engineering, at Politecnico di Milano.
- In A.Y. 2007-2008 Dr. Faifer held the laboratory classes of "Digital Filters" for the M.Sc. in Electrical Engineering, at Politecnico di Milano.
- Since A.Y. 2010-2011 Dr. Faifer has held the laboratory classes of "Electrical Measurement and Measurement Instrumentation" and of "Digital signal processing" for the B.Sc and the M.Sc. degree in Electrical Engineering, at Politecnico di Milano.
- Since A.Y. 2012-2013 Dr. Faifer has held the course of "Measurement and diagnostic techniques" for the M.Sc. degree in Electrical Engineering, at Politecnico di Milano.

- Dr. Faifer was tutor for the eighth cycle of the Alta Scuola Politecnica (school for outstanding students of Politecnico di Milano and Politecnico di Torino).

- He has been advisor and tutor of thesis for the M.Sc. degree in Electrical Engineering, at Politecnico di Milano.

- He has been academic supervisor of a Ph.D. student and tutor of two Ph.D students in Electrical Engineering at Politecnico di Milano.

3. Organizational activity

Dr. Marco Faifer was responsible for the following activities on behalf of the Department of Electrical Engineering, the Dipartimento di Elettronica, Informazione e Bioingegneria and of the course in Electrical Engineering, at Politecnico di Milano:

- From 2008 to 2011 he has organized and taught a course for high school students called HI-TEC. The course aim was to introduce students to the academic world, and in particular to engineering, with a week of lectures at the Politecnico di Milano. Dr. Faifer, in the four years, has personally organized and managed all the activities.

- From 2008 to 2009 he has organized and taught a course for high school students called ESD Week summer. The course included a week of lectures and laboratories at the Politecnico di Milano about various topics of Electrical Engineering.

- He managed the development project of the official websites of the Department of Electrical Engineering and of the course in Electrical Engineering at Politecnico di Milano.

- He is operator and manager of the calibration laboratory for electrical quantities of the Politecnico di Milano, which was a national calibration laboratory (SIT) until 2007 and it is now a laboratory of the quality system of the university.

- He is the responsible person for the High Voltage Laboratory at DEIB, Politecnico di Milano.

- He is responsible for the management of didactic laboratories of Electrical Engineering at DEIB of Politecnico di Milano.

4. Contracts and funding

Dr. Faifer has collaborated to the following projects:

- From 2004 to 2006 he was the executive responsible person for a project funded by Passoni Villa S.p.A. on the subject of innovative sensors in high voltage systems.

- From 2005 to 2008 he was the executive responsible person for the project funded by SEA S.p.A. entitled: “Analysis of methods, devices and systems for the detection of transits in airport areas”.

- In the years 2008-2009 he was the executive responsible person for the project funded by SEA S.p.A. entitled: "Analysis of the stationary magnetic field at Milan Linate airport."

- In the years 2006 - 2008 he participated to the research project PRIN06 entitled "Monitoring of electricity distribution systems in the context of a free market: design and development of architectures metrologically guaranteed for reliable results," manager Prof. Alessandro Ferrero.

- In the years 2008 - 2010 he participated to the research project PRIN08 entitled "Methodologies, architectures and devices metrologically validated for the monitoring of complex electrical systems with a guarantee of robustness and reliability.", manager Prof. Alessandro Ferrero.

- In the years 2009 - 2011 he participated to a research program funded by the “Regione Lombardia” (Call for proposals aimed at the implementation of programs for the development of competitiveness - Regional Law 1/2007) entitled "Development and applicability of the electrical signature in mechatronics for the innovation of predictive diagnostics for machinery", manager Prof. Alessandro Ferrero.

- In the years 2009 - 2011 he participated executive responsible person at the project funded by funded by LOGIC S.p.A. entitled " Solid state technology in the electric distribution system on aircraft."

- In the years 2010 - 2011 he participated executive responsible person at the project funded by funded by ABB S.p.A. entitled " Feasibility study on methods for condition monitoring in low voltage circuit breakers ."

- In 2010, he participated in the research funded by the company GENPORT entitled "Simulation, functional tests, study of control strategies of hybrid solar -hydrogen electric generator".

- Since 2013 is part of the research team winning ABB Research Grant Program entitled:" Towards a smart sensor for DC current measurement approach for circuit breaker applications" .

- In the years 2010 - 2011 he participated as executive responsible person at the research project funded by E.R.S.E. entitled: ” Definition and experimental validation of models of current and voltage instrument transformers of under working conditions”

- In the years 2011 - 2012 he participated as executive responsible person at the research project funded by R.S.E. S.p.A. entitled: “In-depth analysis and experimental validation of models of current and voltage instrument transformers of under working conditions.”

- In the years 2012 - 2013 he participated as executive responsible person at the research project funded by R.S.E. S.p.A. entitled: "New methods for the numerical identification of parameters of models of current and voltage instrument transformers under any working conditions and their experimental validation: main focus on comparative analysis with conventional methods for the identification of the model of the VT and CT."

- 2016-2017-Responsible person on research project: “"Analysis and optimization of the measurement chain of a touch detector for balancing machines" founded by Balance System S.p.a..

- 2019- executive responsible person for the research project: "28VDC and 115VAC Aerospace Arc Fault Detection Methods" founded by AVIC Shanghai Aviation Electric.Co.,Ltd.

- Dr. Faifer continuously works as operator / manager in the calibration laboratory and the high voltage laboratory on testing required by companies.

5. Publication indexes

Data checked in January 2021

- Scopus (126 documents):
  - Citations 1439
  - Index H 22
- Google scholar (158 documents):
  - Citations 1816
  - Index H 23
- Isi web of science (122 documents)
  - Citations 928
  - Index H 18

6. Scientific Activity

The scientific activity of Dr. Marco Faifer has been totally focused on the topics of electrical and electronic measures. All his activities have as common element the use of digital signal processing techniques for the analysis and the characterization of electrical systems and devices as well as the consequent development of measurement systems and methods for their validation. He also works in the field of diagnosis for electrical devices. He is co-author of 25 scientific papers published on international journals, two scientific papers published on a national magazines and more than 80 scientific papers published on the proceedings of national and international conferences.

The main area of investigation are:

1. Measurements on power systems
2. Measurements for the characterization of special concrete
3. Monitoring and diagnostic methods for electrical machines and complex systems
4. Measurements and diagnostic on photovoltaic systems

1. Measurements on power systems

After graduation, Dr. Faifer won a one year researcher position about "Design and development of the electronics section of a combined voltages and currents measurement transformer for high-voltage system compliance with IEC 60044 -7 and IEC 60044-8" arising from a contract between the Electrical and Electronics Measurement group of the Electrical Department of Politecnico di Milano and a company leader in the field of measurement in high voltage systems. The research project was born from a specific interest in the development of measurement devices capable of power quality analysis in HV (High Voltage) systems. In particular, the aim was to obtain a reliable measurement system that could overcome the bandwidth limitations of traditional electromagnetic devices (current and voltage measurement transformers). The proposed solution is not only able to meet all the metrological requirements (class 0.1, 1 kHz bandwidth) but it is also innovative in design choices and features, when compared to other non-conventional HV measurement systems presented in literature or available on the market. The developed measurement transformer was based on two types of transducers integrated into the same structure: two Rogowski coils in differential configuration, allowing

current measurement and a capacitive divider for the voltage measurement. A key feature of the proposed system is its modular architecture, characterized by a specific hardware resources redundancy. This peculiarity, together with specific auto-testing and decision-making logics, makes the system redundant and fault-tolerant [5 CI], [10 CI] and [7 RI].

During the experimental characterization of the electronic transformer, Dr. Faifer dealt with uncertainty estimation issues. This activity has prompted him to review and innovate the methods and the equipment that are usually used in this context. Since this new kind of transformers provides an output voltage signal featuring amplitude of few volts and a frequency band extending up to about one kilohertz, many of the traditional comparators on the market are inadequate. This has pushed Dr. Faifer to explore new methods and instruments that could be used for the calibration of electronic transformers. Starting from this analysis a proposal for a simple yet very accurate device for the evaluation of the ratio and phase measurement errors has been issued. The developed comparator (based on a data acquisition system having two simultaneous sampling channels) can ensure measurement accuracies of the ratio and phase errors on the same magnitude as those featured by commercial solutions, whose cost is considerably higher. The proposed method, as well as its practical implementation and experimental results are given in [9 CI] and [3 RI].

Still on the topic of measurement problems for power quality applications, Dr. Faifer participated, in collaboration with researchers from RSE S.p.A., to the development of new models of the voltage measurement transformer. The need to verify the proposed models, pushed to the development and characterization of an arbitrary waveform generator in medium-voltage. The purpose of this activity has been to identify new models of the voltage measurement transformer that better represent the behavior of this device in non-sinusoidal working conditions. During this research activity, non linear representation has been taken into account, proposing a representation based on simplified Volterra series allowing a more accurate representation of the transducers., [29 CI], [40 CI], [50 CI], [51 CI], [57 CI], [70 CI], [79 CI], [2 RN], [16 RI] [19 RI]

Always in the field of transducers for power systems, Dr. Faifer also contribute to the development of a new current transducer for high current based on shunt technology but featuring high bandwidth, high thermal stability and reduced cost [75 CI]. The current transducer was characterized by means of a wide bandwidth, high current generator designed and developed on the base of the experience and techniques used by Dr. Faifer in the studies on voltage transforms modeling and characterization [78 CI].

Still in the field of the development of innovative systems for calibration, during the activities carried out by Dr. Faifer in the calibration laboratory of the Department of Electrical Engineering (formerly accredited by the Italian Calibration Service, SIT), he has also developed a method and a procedure for the calibration of impedance loop meters. This method can be used to calibrate about all commercial instruments and it can be easily implemented in all the national calibration laboratories. In particular, it has been shown how to adequately estimate all the sources of uncertainty of the proposed method thus defining the resulting uncertainty budget. The goodness of the proposed technique is demonstrated by the fact that, using components and systems with average performances, it has been shown that it is possible to calibrate the most part of commercial impedance loop meters. This work has led to two scientific papers [3 CI] and [1 CNI] and the subsequent publication in a journal [1 RI].

Still about the calibration of electrical equipment, Dr. Faifer has also contributed to the development of a system for the metrological verification of energy meters, based on a random generator of distorted periodic signals. Thanks to the use of this generator and a reference measurement system, it is possible to carry out the verification of the class of the meter even in non-sinusoidal conditions, more similar to real-working conditions. The activity has led to publications [4 RI] , [12 CI] and [2 CNI].

The knowledge about the monitoring activity acquired by Dr. Faifer has been also applied in the field of electrical power systems. In particular, he has collaborated in the development of distributed measurement systems for the remote administration of electrical equipment, where the interconnection between the various devices of the measurement system is made through the Internet. The proposal was to still use an architecture based on the concept of "agency" in which the agents interact so as to allow an independent and dynamic management of the system based on high-level rules. This research was conducted in collaboration with researchers of the University of South Carolina (USA). This activity resulted in the publications [6 CI] and [5 RI].

On the topic of transducer for measurements on power system, Dr. Faifer has written a chapter of a book entitled "Electric Power and Energy Measurement" [B 1].

2. Measurements for the characterization of special concrete

The knowledge of Dr. Faifer about digital signal processing techniques and measurement instrumentation has been also exploited in a collaboration with the researchers from the Department of Structural Engineering of Politecnico di Milano. The aim of this activity has been the development of techniques and systems for the analysis of structures made of concrete reinforced with steel fibers (SFRC). In particular, the objective has been the estimation of two crucial parameters affecting the mechanical properties of the material: concentration and preferential orientation of the fibers. Starting from a study on the dielectric and magnetic properties of such composite materials, it has been possible to develop methods for a non-invasive monitoring of SFRC structural elements. At the beginning of this activity a method analyzing the dielectric properties of the material, which is an evolution of the methods available in the literature, has been proposed [17 CI]. Although this method has proven to be effective, new investigations have been carried on, sensing that better performance could be obtained by analyzing the magnetic properties of the SFRC. Therefore it has been developed a method based on the analysis of reluctance change of a magnetic circuit including the specimen due to the presence of the steel fibers. A measurement system based on a probe consisting of a C-shaped ferrite core and having one or more windings has been presented. The system allows to assess the equivalent electrical parameters of the probe in a frequency range between 1 kHz and 10 kHz. It has been demonstrated a direct relationship between the variation of inductance and/or mutual inductance of the probe and the concentration of fiber present in the analyzed portion of SFRC. The method also allows to estimate the preferential direction of the fibers. The proposed method has been compared with other conventional techniques so as to test its performance. This activity was recently extended to an international collaboration with researcher from Université Laval, (Department of Water and Civil Engineering, Quebec, Canada), Institut National de Sciences Appliquées de Lyon (France) and IFSTTAR, Universitè Paris-Est, (France). The research activity resulted in numerous publications on conference proceedings [5 CNI], [19 CI], [23 CI], [26 CI], [27 CI], [32 CI], [38 CI], [73 CI], [74 CI] and on several journals [1 RN], [6 RI], [8 RI], [9 RI], [12 RI], [23 RI].

3. Monitoring and diagnostic methods for electrical machines and complex systems

Monitoring issues have been dealt by Dr. Faifer since he began his M.Sc. thesis work, whose title is "Electric and magnetic fields sensors for applications with navigator robots". During this activity Dr. Faifer has designed, implemented and characterized a prototype based on a DSP processor, able to measure the electric and magnetic fields in the three spatial directions. The proper collection and integration of the measurement data with the geographical location, allows to make up a mapping of the values of electric and magnetic fields on even a widespread area [1 CI]. Mapping that could be achieved in very efficient way by M2M approach (Machine-to-Machine), allowing the planning, the management and the analysis of measurements based on negotiation between various robots (or agents) [2 CI].

The knowledge gained about digital signal processing permitted Mr. Faifer to develop a measurement system for the identification and classification of objects passing on runway of airports. This work has been carried out during a collaboration with society SEA spa, which manages the airports of Milan. The proposed system consists of a microwave barrier that allows detecting the passage of an object. By applying complex statistical analysis techniques to the signal acquired by a microwave receiver, it has been shown that it is possible to identify the passing object. During this activity, issues related to the design of systems for the implementation of decision-making criteria and based on advanced algorithms for the classification and recognition of complex events have been faced [4 CI].

The topic of diagnostic systems for electrical equipment has been faced by Dr. Faifer since his PhD work, whose theme was " Innovative methods and measurement systems for the diagnostics of high voltage equipment." This subject was chosen by Dr. Faifer because of the experience acquired during the research on HV measurement transformers, where he found a considerable interest about preventive diagnostics in electrical HV systems, highlighted both by a growing increase in scientific work on these issues and by a strong demand from industry. After a preliminary analysis about HV systems, Dr. Faifer focused its attention on a particular component that is the bushing for transformers. The choice fell on this device since it is responsible for about 45% of power transformers failures. Up today there are no effective on-line diagnostic systems for these devices. Dr. Faifer has developed a diagnostic method based on direct measurements on bushing for power transformers. The proposed method can track the condition of the bushing without putting the system out of service. The method is based on an impedance evaluation performed at the tap of the bushing. The measurement is done through digital signal processing techniques, supported by a specifically designed analog interface and a high frequency excitation system. The developed system ensures the required insulation, and its low cost permits its permanent and widespread installation allowing on-line monitoring of the bushings [25 CI], [30 CI], [63 CI].

The research on transducer modeling has been used also for diagnostic purpose. In fact the non linear modelling of voltage transformers (VT) based on Volterra series has been exploited for proposing an on-line diagnostic method for these transducers. The technique allows to verify the calibration of the VT over frequency by using the actual line voltage as signal of stimulus and a Volterra model of the VT [72 CI] **..**

Another research topic of Dr. Faifer is the study of fault detection techniques based on the measurement of the so-called "electrical signature" of the device. Dr. Faifer has applied this approach to the electrical machines diagnostics. The activity has led to the development of some algorithms for the detection of rotor cage faults in inverter fed induction machines. Conventional techniques are based on the analysis of the stator current (the so called Motor Current Signature Analysis) but many of them require computationally-intensive digital signal processing algorithms. On the contrary, the proposed technique allows to recognize the fault starting from the acquisition of the AC mains currents and performing simple operations that can be easily implemented using a low cost microprocessor. The research allowed to propose fault indexes and proper hardware allowing to monitor the state of health of the rotor gage of induction machines. This research activity resulted in numerous publications on conference proceedings [3 CNI], [7 CI], [8 CI], [11 CI], [16 CI], [18 CI], [20 CI], [22 CI], [28 CI] and on journals [2 RI], [10 RI].

Still about the diagnosis of complex systems, Dr. Faifer was involved in the development of diagnostic methods for water jet cutting systems. Even in this case, through the analysis of the electrical quantities of the machine, it has been proved that it is possible to extract information about the wear status of the system. The work, carried on in collaboration with researchers of the Department of Electronics and Information and of the Department of Mechanics, of the Politecnico di Milano, led to the publications [14 CI] and [15 CI].

Always in the field of diagnostic, in collaboration with researcher of the Cranfield University, Dr. Faifer was involved in the development of diagnostic methods for IGBTs and DC/DC converters life extension based on switching frequency optimization [62 CI], [64 CI], [76 CI], [77 CI].

4. Measurements and diagnostic on photovoltaic systems

Still about the diagnostics and characterization of electrical systems, Dr. Faifer has developed a wide research on photovoltaic (PV) systems. The research has been focused on the modelling of PV systems with the target to develop new and efficient algorithm of maximum power point tracking (MPPT) of PV panels and the development of diagnostic techniques. The problem has been faced both from a software and hardware point of view [21 CI], [43 CI], [71 CI], [22 RI]. By means of extensive measurement campaigns, the problem of efficiency degradation due to the presence of dust on the panel surface has been faced. This failure resulted to be one of the most critical causes of the system degradation on the base of FMECA (Failure Mode Effect Criticality Analysis). Starting from the results of the FMECA it was then shown that it is possible to analyze the levels of dust on reference panel and inferring these results to a bigger systems made up of an even high number of panels of the same kind [4 CNI], [24 CI], [36 CI], [53 CI], [59 CI], [13 RI], [65 CI].

During this activity new simplified models of the solar systems have been proposed. These models better allow to interpret the parameters involved in the degradation phenomenon thus permitting an effective implementation of diagnostic techniques [31 CI], [33 CI], [46 CI], [58 CI], [11 RI], [15 RI]. During this activity new methods of identification of the maximum power point of photovoltaic panels were also proposed and experimentally validated [34 CI] [45 CI], [52 CI], [61 CI], [14 RI]. Experimental comparison of MPPT algorithms has been proposed in order to show weak and strong points of the algorithms and of the hardware required for them implementation [60 CI], [68 CI]. The analysis of the causes of degradation has led to the evaluation of system performance and to the proposal of alternative methods for the management and the maintenance of photovoltaic systems [35 CI], [37 CI], [48 CI], [54 CI] [55 CI], [56 CI], [67 CI], [18 RI].

The research investigated the definition of methods for the prediction of the energy generated by solar plant [39 CI], [41 CI], [44 CI], [49 CI], [17 RI].

The experience in the field of PV systems has been used by Dr. Faifer for the characterization of new kinds of PV cells [69 CI] and in applications in the field of social collaboration for the development of a standalone refrigerator for rural areas [21 RI].

These research activities on photovoltaic systems have been carried on in collaboration with researchers at the University of Florence, the University of Milan and the University RWTH Aachen, Germany.

5. Publications

International journals

[1 RI] M. Faifer, G.M. Foglia, R. Perini, L. Rocca, "The Calibration of Loop Impedance Meters: a Proposal, " IEEE Transactions on Instrumentation and Measurement, vol. 56, pp. 1285 – 1291, Aug. 2007.

[2 RI] L. Cristaldi, M. Faifer, M. Lazzaroni, S. Toscani, "An Inverter Fed Induction Motor Diagnostic Tool Based on Time-Domain Current Analysis," IEEE Transactions on Instrumentation and Measurement, vol. 58, pp. 1454 – 1461, May 2009.

[3 RI] A. Brandolini, M. Faifer, R. Ottoboni, "A simple method for the Calibration of Traditional and Electronic Measurement Current and Voltage Transformers," IEEE Transactions on Instrumentation and Measurement, vol. 58, pp. 1345 - 1353, May 2009.

[4 RI] Alessandro Ferrero, Marco Faifer, Simona Salicone, "On testing the electronic revenue energy meters," IEEE Transactions on Instrumentation and Measurement, vol. 58, pp. 3042 – 3049, Sept. 2009.

[5 RI] F. Ponci, L. Cristaldi, M. Faifer and M. Riva, "Multi agent systems: An example of power system dynamic reconfiguration", Integrated Computer-Aided Engineering, vol. 17, pp. 359-372, 2010.

[6 RI] M. Faifer, R. Ottoboni, S. Toscani, L.Ferrara, "Non-destructive Testing of Steel Fiber Reinforced Concrete using a Magnetic Approach," IEEE Transactions on Instrumentation and Measurement, vol. 60, pp. 1709 - 1717, May 2011.

[7 RI] M. Faifer, R. Ottoboni, S. Toscani,"Electronic Combined Transformer for Power-Quality Measurements in High-Voltage Systems," IEEE Transactions on Instrumentation and Measurement, vol. 60, pp. 2007 -2013, June 2011.

[8 RI] L. Ferrara, M. Faifer, S.Toscani , "A magnetic method for non destructive monitoring of fiber dispersion and orientation in steel fiber reinforced cementitious composites- part 1: method calibration," Materials and Structures/Materiaux et Constructions, vol. 45, pp. 575-589, 2012.

[9 RI] L. Ferrara, M. Faifer, M. Muhaxheri, S. Toscani, "A magnetic method for non destructive monitoring of fiber dispersion and orientation in steel fiber reinforced cementitious composites- Part 2: Correlation to tensile fracture toughness," Materials and Structures/Materiaux et Constructions, vol. 45 , pp. 591-598, 2012.

[10 RI] S. Toscani, M. Faifer, M. Rossi, L. Cristaldi, M. Lazzaroni, "Effects of the Speed Loop on the Diagnosis of Rotor Faults in Induction Machines," IEEE Transactions on Instrumentation and Measurement, vol. 61, pp. 2713 –2722, Oct. 2012.

[11 RI] Loredana Cristaldi, Marco Faifer, Marco Rossi and Ferdinanda Ponci, "A Simple Photovoltaic Panel Model: Characterization Procedure and Evaluation of the Role of Environmental Measurements," IEEE Transactions on Instrumentation and Measurement, vol. 61, pp. 2632 -2641, Oct. 2012.

[12 RI] Marco Faifer, Liberato Ferrara, Roberto Ottoboni and Sergio Toscani, "Low Frequency Electrical and Magnetic Methods for Non-Destructive Analysis of Fiber Dispersion in Fiber Reinforced Cementitious Composites: An Overview," Sensors, vol. 1, pp. 1300-1318, Jan. 2013

[13 RI] Marcantonio Catelani, Lorenzo Ciani, Loredana Cristaldi, Marco Faifer, Massimo Lazzaroni, "Electrical performances optimization of Photovoltaic Modules with FMECA approach," *Measurement*, vol. 46, pp. 3898-3909, Dec. 2013.

[14 RI] Loredana Cristaldi, Marco Faifer, Marco Rossi and Sergio Toscani, "An Improved Model-Based Maximum Power Point Tracker for Photovoltaic Panels," IEEE Transactions on Instrumentation and Measurement, vol. 63, pp. 63 -71, Jan 2014.

[15 RI] Cristaldi, L. , Faifer, M., Rossi, M., Toscani, S., Catelani, M., Ciani, L. , Lazzaroni, M., "Simplified method for evaluating the effects of dust and aging on photovoltaic panels," Measurement, vol. 54, pp. 207-214, Aug. 2014.

[16 RI] Marco Faifer, Roberto Ottoboni, Sergio Toscani, Claudio Cherbaucich, Paolo Mazza, "Metrological Characterization of a Signal Generator for the Testing of Medium-Voltage Measurement Transducers," IEEE Transactions on Instrumentation and Measurement, vol. 64, pp. 1837 -1846, July 2015.

[17 RI] Massimo Lazzaroni, Stefano Ferrari, Vincenzo Piuri, Ayse Salman, Loredana Cristaldi, Marco Faifer, "Models for solar radiation prediction based on different measurement sites" Measurement, vol. 63, pp. 346-363, March 2015.

[18 RI] L. Cristaldi, M. Faifer, M. Lazzaroni, M.M.A.F. Khalil, M. Catelani, L. Ciani, "Diagnostic architecture: A procedure based on the analysis of the failure causes applied to photovoltaic plants" Measurement, vol. 67, pp. 99-107, May 2015.

[19 RI] M. Faifer, R. Ottoboni, M. Prioli, S. Toscani, "Simplified Modeling and Identification of Nonlinear Systems Under Quasi-Sinusoidal Conditions," IEEE Transactions on Instrumentation and Measurement, vol. 65, pp.1508-1515, June 2016.

[20 RI] Loredana Cristaldi; Daniele Clerici; Marco Faifer; Alessandro Ferrero, " Monitoring system for arc furnace casting processes," International Journal of Industrial and Systems Engineering, vol. 23, pp.3-18, 2016.

[21 RI] C. Del Pero, F.M. Butera, L. Piegari, M. Faifer, M. Buffoli, P. Monzani, "Characterization and monitoring of a self-constructible photovoltaic-based refrigerator," Energies, vol. 9, pp.1-14, 2016.

[22 RI] S. Ferrari, M. Lazzaroni, V. Piuri, A. Salman, L. Cristaldi, M. Faifer, S. Toscani, "Solar panel modelling through computational intelligence techniques," Measurement: Journal of the International Measurement Confederation, vol. 93, pp. 572-580, 2016.

[23 RI] Liberato Ferrara, Massimiliano Cremonesi, Marco Faifer, Sergio Toscani, Luca Sorelli, Marc-Antoine Baril, Julien Réthoré, Florent Baby, François Toutlemonde, Sébastien Bernardi, "Structural elements made with highly flowable UHPFRC: Correlating computational fluid dynamics (CFD) predictions and non-destructive survey of fiber dispersion with failure modes," Engineering Structures, vol. 133, pp.151-171, 2017.

[24 RI] Ting Lei, Marco Faifer, Roberto Ottoboni, Sergio Toscani, "On-Line Fault Detection Technique for Voltage Transformers," Measurement: Journal of the International Measurement Confederation, vol. 108, pp. 193-200, 2017.

[25 RI] Marco Faifer, Roberto Ferrero, Christian Laurano, Roberto Ottoboni, Sergio Toscani, Michele Zanoni, "A Low-Cost Approach to the Skin Effect Compensation in Cylindrical Shunts," ," IEEE Transactions on Instrumentation and Measurement, vol. 66, pp. 2266-2273, Sept 2017.

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