Research Contribution

- International Journals (Published)

[1] Deepak C. Bhonsle and Ramesh B. Kelkar, "Performance Evaluation of Composite Filter for Power Quality improvement of Electric Arc Furnace Distribution Network", Journal of Electrical Engineering, "Politechnica" Publishing House, ISSN 1582-4594 Vol. 14, Issue 3, pp. 234-239, September 2014 (http://www.jee.ro/covers/editions.php?issue_id=ID1412107164I542b0b9cefc84):

This paper presents performance evaluation of composite filter for power quality improvement of EAF distribution network. The composite filter is consisting of a shunt LC passive filter connected with a lower rated voltage source PWM converter based series active power filter (SAPF). Performance of the composite filter (CF) is compared and analyzed with that of passive filter to improve power quality at point of common coupling (PCC). Simulation for a typical EAF distribution network along with the passive filter and the composite power filter has been carried out to validate the performance. The simulations have been carried out in MATLAB environment using SIMULINK and power system block set toolboxes.

[2] Deepak C. Bhonsle and Ramesh B. Kelkar, "Mathematical Modeling of Composite Filter for Power Quality improvement of Electric Arc Furnace Distribution Network", Journal of Electrical Engineering, "Politechnica" Publishing House, ISSN 1582-4594 Vol. 14, Issue 4, pp. 113-119, December 2014 (http://www.jee.ro/covers/editions.php?act=front&issue_id=IP1418906686I5492cc3edd736):

This paper presents mathematical modeling of composite filter (CF) for power quality improvement of electric arc furnace (EAF) distribution network. The composite filter is consisting of a shunt passive filter (SHPF) connected with a lower rated voltage source pulse width modulation (PWM) converter based series active power filter (SAPF). A state-space averaging model of a CF is constructed to analyze its system

stability by traditional control strategy taking into account the effect of the time delay. The control strategy adopted for composite filter operation is based on simultaneous detection of source current and load voltage harmonic based on the vectorial theory dual formulation of instantaneous reactive power. Simulation for a typical EAF distribution network with a composite power filter has been carried out to validate the performance. Simulation results are shown in an attempt to verify the mathematical model of the filter. The simulations have been carried out in MATLAB environment using SIMULINK and power system block set toolboxes.

[3] Deepak C. Bhonsle and Ramesh B. Kelkar, "New Time Domain Electric Arc Furnace Model for Power Quality Study", Journal of Electrical Engineering, "Politechnica" Publishing House, ISSN 1582-4594, Vol. 14, Issue 3, pp. 240-246, September 2014 (http://www.jee.ro/covers/editions.php?issue_id=ID1412107164I542b0b9cefc84):

This paper presents a new time domain model of electric arc furnace to study power quality problems. The proposed model is a combination of two previous EAF models called-Exponential and hyperbolic model-using transition functions. The functioning of the proposed model has been validated by comparing its performance characteristics with the existing Cassie-Mayr EAF model. Simulation carried out in SIMULINK/MATLAB environment.

- International Conferences (Published/Presented)

[1] Deepak C. Bhonsle and Ramesh B. Kelkar, "Mathematical Modeling of Composite Filter for Power Quality improvement of Electric Arc Furnace Distribution Network", 2014 IEEE 6th International Conference on Power Electronics (IICPE 2014) National Institute of Technology, Kurukshetra, Haryana, India, 8-10 Dec. 2014, pp. 1-5 (http://ieeexplore.ieee.org/xpl/articleDetails.jsp?tp=&arnumber=7115762):

Electrical Arc Furnace (EAF) is one of the responsible cause for deteriorating power quality in the distribution network by, introducing harmonics, propagating voltage flicker and causing unbalance in voltages and currents. This paper presents mathematical modeling of composite filter (CF) for power quality improvement of EAF distribution network. The composite filter is consisting of a shunt LC passive

filter connected with a lower rated voltage source PWM converter based series active power filter (SAPF). The control strategy adopted for composite filter operation is based on simultaneous detection of source current and load voltage harmonic based on the vectorial theory dual formulation of instantaneous reactive power. A state-space averaging model of a composite filter constructed to analyze its system stability by traditional control strategy taking into account the effect of the time delay. Simulation for a typical EAF distribution network with a composite power filter has been carried out to validate the performance. Simulation results are shown in an attempt to verify the mathematical model of the filter. The simulations have been carried out in MATLAB environment using SIMULINK and power system block set toolboxes.

[2] Deepak C. Bhonsle and Ramesh B. Kelkar, "New Time Domain Electric Arc Furnace Model for Power Quality Study", Journal of Electrical Engineering,2014 IEEE 6[th]International Conference on PowerElectronics (IICPE 2014) National Institute of Technology, Kurukshetra, Haryana, India, 8-10 Dec. 2014, pp. 1-6 (http://ieeexplore.ieee.org/xpl/articleDetails.jsp?tp=&arnumber=7115761):
Power quality is becoming a more concern of today's power system engineer due to rapid growth of non-linear loads in distribution network. Electric arc furnace (EAF) is one of the typical industrial non-linear loads responsible for deteriorating the power quality in the distribution network by-introducing harmonics, propagating voltage flicker and causing unbalance- in voltages and currents. Hence electric arc furnace model is needed to study and to analyze the power quality in the distribution network. This paper presents a new time domain model of electric arc furnace to study power quality problems. The proposed model is a combination of two previous EAF models called-Exponential and hyperbolic model-using transition functions. The functioning of the proposed model has been validated by comparing its performance characteristics with the existing Cassie-Mayr EAF model. Simulation carried out in SIMULINK/MATLAB environment.

[3] Bhonsle, Deepak Chhaganrao and Kelkar, Ramesh B, "Design and analysis of composite filter for power quality improvement of electric arc furnace", IEEE 3rd International Conference on Electric Power and Energy Conversion Systems

(EPECS), 2013, 2-4 October 2013, Turkey, Istanbul, pp. 1-10. (http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6713091):

This paper presents design, analysis and simulation of composite filter for improving power quality of distribution network. The distribution network consists of non-linear load as an Electric arc furnace. Passive filters have been preferred for power quality improvement due to low cost, simplicity, reliability and control-less operation. At first passive filter has been designed to compensate current and voltage harmonics. The drawback associated with the passive filter is tried to solve by connecting a series active power filter along with the passive filter thus forming a composite filter. Performance of composite filter and passive filter is compared and analyzed to improve the power quality and at point of common coupling. The composite filter is consisting of a shunt LC passive filter connected with a lower rated voltage source PWM converter based series active power filter. Simulation for a typical distribution network with a composite power filter has been carried out to validate the performance. The simulations have been carried out in MATLAB environment using SIMULINK and power system block set toolboxes.

[4] Bhonsle, D. C. and Kelkar, R. B., "Simulation of Electric Arc Furnace Characteristics for Voltage Flicker study using MATLAB", IEEE International Conference on Recent Advancements in Electrical, Electronics and Control Engineering (IConRAEeCE 2011), 15-17 December 2011, Sivakasi, pp. 174-181. (http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6129773):

Power quality is becoming a more concern of today's power system engineer due to the rapid growth of non-linear loads, such as power electronic control equipments and electric arc furnace (EAF). Harmonics and voltage flicker are the power quality problems which are introduced to the power system as result of non-linear behavior of the electric arc furnace operation. Electric arc furnace model is needed to analyze the power quality. There are numbers of arc furnace models. This paper presents a time domain model called exponential-hyperbolic for electric arc furnace using MATLAB. The model is used to study its behavior on the power system using MATLAB. To analyze the method, several characteristics for different operating conditions are investigated.

[5] Bhonsle, D. C. and Kelkar, R. B., "Design and Simulation of Single Phase Active Power Filter using MATLAB", 15-17 December 2011, IEEE International Conference on Recent Advancements in Electrical, Electronics and Control Engineering (IConRAEeCE 2011), 15-17 December 2011, Sivakasi, pp. 237-241. (http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6129786):

Large considerations of these loads have the potential to raise harmonic voltage and currents in an electrical distribution system to unacceptable high levels that can adversely affect the system. IEEE standards have defined limits for harmonic voltages and harmonic currents. Active power filters have been considered a potential candidate to bring these harmonic distortions within the IEEE limits. This paper deals with an active power filter (APF) based on simple control. A voltage source inverter with pulse width modulation (PWM) is employed to form the APF. A diode rectifier feeding capacitive-resistive load is considered as nonlinear load on ac mains for the elimination of harmonics by the proposed APF. MATLAB model of the scheme is simulated and obtained results are studied.

[6] Bhonsle, D. C. and Kelkar, R. B., "Harmonic Pollution Survey and Simulation of Passive Filter using MATLAB", IEEE International Conference on Recent Advancements in Electrical, Electronics and Control Engineering (IConRAEeCE 2011), 15-17 December 2011, Sivakasi, pp. 230-236. (http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6129785):

This paper presents harmonic field measurement for domestic loads in power distribution network. The specific case study has been conducted at C K Pithawalla college of Engineering and Technology, Surat, Gujarat. It includes non-linear loads such as-personal computer, LCD, laptop, etc. Harmonic measurement was conducted for individual loads. The selected domestic load is simulated using MATLAB software. Simulation and design of passive filter is presented in METLAB for harmonic mitigation. Results of the same are analyzed taking in to account IEEE standards limits for harmonic distortion.

[7] D. C. Bhonsle, N. K. Zaveri and Dr. R. B. Kelkar, "Simulation of Single Phase Active Power Filter using MATLAB", 6-10 July, The International Conference on Electrical

Engineering 2008, No. O-152, ICEE 2008, Okinawa, Japan. (http://www.icee-con.org/papers/2008/2008.html):

Power Quality issues are becoming a major concern of today's power system engineers. Harmonics play significant roll in deteriorating power quality, called harmonic distortion. Harmonic distortion in electric distribution system is increasingly growing due to the widespread use of nonlinear loads. Large considerations of these loads have the potential to raise harmonic voltage and currents in an electrical distribution system to unacceptable high levels that can adversely affect the system. IEEE standards have defined limits for harmonic voltages and harmonic currents. Active power filters have been considered a potential candidate to bring these harmonic distortions within the IEEE limits. This paper deals with an active power filter (APF) based on simple control. A voltage source inverter with pulse width modulation (PWM) is employed to form the APF. A diode rectifier feeding capacitive-resistive load is considered as nonlinear load on ac mains for the elimination of harmonics by the proposed APF. MATLAB model of the scheme is simulated and obtained results are studied.

[8] D. C. Bhonsle, N. K. Zaveri and Dr. R. B. Kelkar, "Harmonic Survey of Typical Non-linear Loads", 6-10 July, International Conference on Electrical Engineering 2008, No. O-181, ICEE 2008, Okinawa, Japan. (http://www.icee-con.org/papers/2008/2008.html):

Power Quality issues are becoming a major concern of today's power system engineers. Harmonics play significant role in deteriorating power quality, called harmonic distortion. Harmonic distortion in electric distribution system is increasingly growing due to the widespread use of nonlinear loads. Large considerations of these loads have the potential to raise harmonic voltage and currents in an electrical distribution system to unacceptable high levels that can adversely affect the system. IEEE standards have defined limits for harmonic voltages and harmonic currents. Active power filters have been considered a potential candidate to bring these harmonic distortions within the IEEE limits. This paper deals with an active power filter (APF) based on simple control. A voltage source inverter with pulse width modulation (PWM) is employed to form the APF. A diode rectifier

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[9] D. C. Bhonsle, N. K. Zaveri and Dr. R. B. Kelkar, "Simulation of Single Phase Active Power Filter using MATLAB", Power System Analysis, and Optimization (PSACO-2008), TEQIP and IEEE sponsored, Visakhapatnam, India, 13-15 March 2008 Proceedings, pp. 488-492:

Large considerations of these loads have the potential to raise harmonic voltage and currents in an electrical distribution system to unacceptable high levels that can adversely affect the system. IEEE standards have defined limits for harmonic voltages and harmonic currents. Active power filters have been considered a potential candidate to bring these harmonic distortions within the IEEE limits. This paper deals with an active power filter (APF) based on simple control. A voltage source inverter with sinusoidal pulse width modulation (SPWM) is employed to form the APF, which uses minimum measured variables to make it cost effective. A diode rectifier feeding capacitive-resistive load is considered as nonlinear load on ac mains for the elimination of harmonics by the proposed APF. A detailed dynamic model of the scheme is simulated and obtained results are studied.

• National Conferences (Published/Presented)

[1] Deepak C. Bhonsle and Dr. R. B. Kelkar, "Time Domain Electric Arc Furnace Modeling-A Survey", Proceedings of Recent Trends In Electrical and Electronics & Communication Engineering (RTEECE-2014) 17th-18th January 2014 in the International Journal of Engineering Development and Research (IJEDR, ISSN: 2321-9939), pp. 66-71. (http://www.ijedr.org/rteece14.php)

[2] D. C. Bhonsle and Dr. R. B. Kelkar, "Design and Simulation of Single Phase Shunt Active Power Filter for Harmonic Mitigation in Distribution System", National Conference on Recent Advances in Electrical & Electronics Engineering, RAEEE-09, NIT, Hamirpur (H. P.), 23-24 Dec'09 Proceedings.

[3] D. C. Bhonsle and Dr. R. B. Kelkar, "Measurement and MATLAB Simulation of Passive Filter", National Conference on Recent Advances in Electrical & Electronics Engineering, RAEEE-09, NIT, Hamirpur (H. P.), 23-24 Dec'09 Proceedings

[4] D. C. Bhonsle and Dr. R. B. Kelkar, "Harmonic Survey of Typical Non-linear Loads", National Seminar on Maintenance of Electrical Equipment and Energy Management, Vadodara, Gujarat. May 2009 Proceedings, pp. Session F 12-16

[5] D. C. Bhonsle, N. K. Zaveri and Dr. R. B. Kelkar D. C. Bhonsle, N. K. Zaveri and Dr. R. B. Kelkar, "Simulation of Single Phase Active Filter using MATLAB", National Conference on Recent Advances in Electrical Machines and Energy Systems, REMES 2008, CITC, Changa, Gujarat. September 2008 Proceedings, pp. 156-160

[6] D. C. Bhonsle, N. K. Zaveri and Dr. R. B. Kelkar, "Harmonic Measurement and Simulation of Single Tuned Passive Filter for Harmonic Mitigation in Distribution Systems", National Conference on Recent Advances in Electrical Machines and Energy Systems, REMES 2008, CITC, Changa, Gujarat. September 2008 Proceedings, pp. 148-155

[7] D. C. Bhonsle, N. K. Zaveri and Dr. R. B. Kelkar, "Power Quality Issues-In Distribution System", IE (I) 23rd National Convention of Electrical Engineers, Pune, November 2007 Proceedings, pp. 108-111.