International Journal for Innovative Engineering and Management Research
A Peer Revieved Open Access International Journal
www.ijiemr.org

COPY RIGHT

IJIEMR Transactions, online available on 23th December 2017. Link :
http://www.ijiemr.org/downloads.php?vol=Volume-6&issue=ISSUE-13

Title: Performance of Power System Network with Combined UPQC And PV System for improving power Quality.

Volume 06, Issue 13, Page No: 187 - 191.

Paper Authors

*** A.C.VIJAYA MADHAVI, G.N.S.VAIBHAV.**

* PVKK Institute of Technology.

USE THIS BARCODE TO ACCESS YOUR ONLINE PAPER

To Secure Your Paper As Per UGC Guidelines We Are Providing A Electronic Bar Code

International Journal for Innovative Engineering and Management Research
A Peer Revieved Open Access International Journal
www.ijiemr.org

PERFORMANCE OF POWER SYSTEM NETWORK WITH COMBINED UPQC AND PV SYSTEM FOR IMPROVING POWER QUALITY

***A.C.VIJAYA MADHAVI, **G.N.S.VAIBHAV**

* PG Scholar, PVKK Institute of Technology, Anantapuramu.
**Head of the Department, PVKK Institute of Technology, Anantapuramu.

ABSTRACT:

those In a powers device community there are numerous troubles associated with energy exceptional. So to improve power quality of a system we use different gadgets consisting of lively electricity filters. energetic energy filters are labeled into kinds that is Shunt active electricity filter (APF) and series energetic power filter out (APF) and combination of both is referred to as UPQC (Unified power exceptional Conditioner). here we have performed simulation of Shunt energetic energy clear out, series energetic energy clear out and Unified energy fine Conditioner. Shunt APF is used to mitigate the troubles because of modern-day harmonics which is because of non-linear load and make supply modern-day sinusoidal and distortion unfastened. The manage scheme used is hysteresis modern-day controller the use of "p-q theory". collection APF is used to mitigate problems induced due to voltage distortion and unbalance found in supply voltage and make load voltage perfectly balanced and controlled. The control scheme used is Hysteresis voltage controller via using a-b-c to d-q adjustments. Then Shunt APF and collection APF is mixed for designing UPQC and through this present day harmonics in load modern and voltage unbalances in supply voltage each are removed and supply contemporary turns into sinusoidal and load voltage turns into perfectly balanced.

key words: UPQC, lively strength filter, Harmonics.

1. INTRODUCTION

because of energy electronics gadgets there may be critical effect on fine and continuousness of electric deliver. because of electricity electronics devices there's uninterrupted electricity supply, flicker, harmonics, voltage fluctuations e.tc. there is also PQ problems inclusive of voltage upward push/dip because of network faults, lightning, switching of capacitor banks. With the immoderate makes use of of non-linear load (laptop, lasers, printers, rectifiers) there is reactive energy disturbances and harmonics in energy distribution machine. it's far very vital to overcome this sort of issues as its impact can also growth in future and purpose destructive impact. In today's international there's splendid importance of electrical strength as it is the most well-known from of strength and all are vastly relying on it. with out deliver of electricity existence cannot be imagined. at the equal time the high-quality and continuousness of the electric strength supplied is also very important for the efficient functioning of the quit user system. a number of the commercial and industrial hundreds require excessive first-class undisturbed and consistent energy. as a consequence retaining the qualitative power is topmost essential in these days's global. because of power electronics devices there is serious effect on satisfactory and continuousness of electrical deliver. due to power electronics devices there is uninterrupted power deliver, flicker, harmonics, voltage fluctuations e.tc. there is also PQ troubles together with voltage rise/dip due to network faults, lightning, switching of capacitor banks. With the immoderate makes use of of non-linear load (pc, lasers, printers, rectifiers) there may be reactive strength disturbances and harmonics in strength distribution system. it's far very essential to overcome this type of problems as its impact can also growth in future and

International Journal for Innovative Engineering and Management Research
A Peer Revieved Open Access International Journal
www.ijiemr.org

reason unfavourable impact. historically passive filters have been used for reactive strength disturbances and harmonics generation however there may be many troubles with them like they're huge in length, resonance hassle, impact of source impedance on overall performance. active electricity Filters are used for energy best enhancement. active electricity filters may be labeled according to machine configuration. energetic strength filters are of two sorts series and shunt. Combining both collection APF & shunt APF we get a device known as UPQC. UPQC gets rid of the voltage and modern based distortions together. A Shunt APF eliminates all form of current issues like cutting-edge harmonic repayment, reactive energy reimbursement, energy factor enhancement. a chain APF compensates voltage dip/upward push so that voltage at load side is flawlessly regulated. The Shunt APF is hooked up in parallel with transmission line and collection APF is connected in collection with transmission line.

UPQC is shaped via combining both collection APF and shunt APF linked returned to lower back on DC facet. on this controlling strategies used is hysteresis band controller the usage of "p-q idea" for shunt APF and hysteresis band controller the use of Park's transformation or dq0 transformation for series APF. UPQC is made by means of combining both shunt APF and series APF. UPQC is used to cast off all problems because of modern harmonics and voltage unbalances & distortions and enhance energy first-rate of a device. UPQC is a completely versatile tool as at same time it mitigates the problem each three due to current and voltage harmonics. on this thesis energy great of machine changed into improved through the usage of UPQC. First simulation of shunt APF become carried out after that series APF turned into completed. And after that combining both device simulation of UPQC turned into executed.

2. UPQC

essentially UPQC (Unified electricity high-quality conditioner) is a device which is used for catch up on voltage distortion and voltage unbalance in a power device so that the voltage at load facet is completely balance and sinusoidal & perfectly regulated and also it's far used to compensate for load current harmonics so that the modern-day at the source aspect is flawlessly sinusoidal and loose from distortions and harmonics. UPQC is a mixture of a Shunt lively electricity filter and collection active electricity clear out. here Shunt active strength filter out (APF) is used to catch up on load modern harmonics and make the supply modern-day absolutely sinusoidal and free from harmonics and distortions.

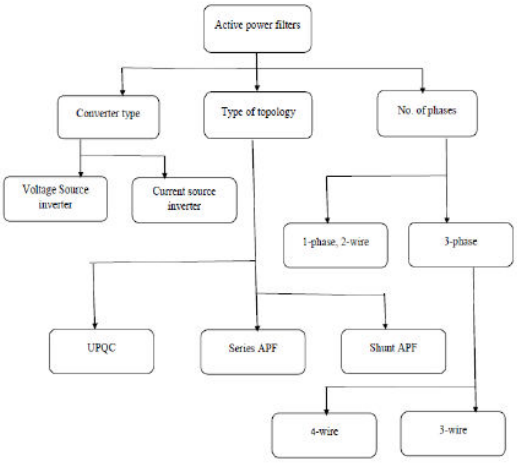

Fig 2.1 Active power filter classification

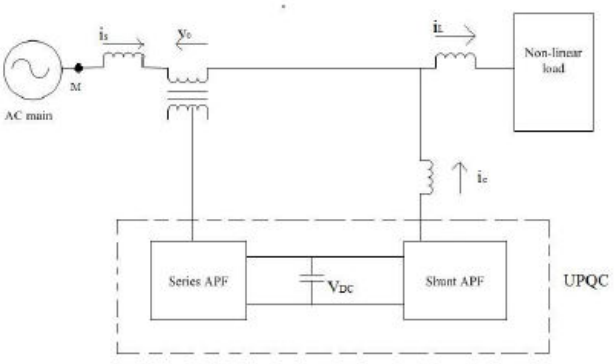

Fig 2.2 Operation of UPQC

International Journal for Innovative Engineering and Management Research
A Peer Revieved Open Access International Journal
www.ijiemr.org

3.1 series APF:- In a transmission line series APF is normally connected in collection. it is related to the transmission line with the transformer. collection APF is a voltage supply inverter linked in series with transmission line. it is used to compensate or mitigate the issues which comes due to voltage distortions and voltage unbalances. The series APF injects a compensating voltage in order that load voltage might be flawlessly balanced and controlled. Controlling of collection inverter is carried out by PWM (pulse width modulation) techniques. right here we used Hysteresis band PWM strategies as it implementation is easy. also its response is speedy. Its info are defined in subsequent sections.

3.2 Shunt APF: - In a transmission line shunt APF is usually connected in parallel. Shunt APF is used to atone for distortions & harmonics which might be produced due to modern. due to non- linear load there's harmonics in load current, so that you can hold source current absolutely sinusoidal and distortion loose we uses Shunt APF. Shunt APF injects compensating current so that the supply contemporary is absolutely sinusoidal and loose from distortions. Controlling of Shunt APF is accomplished by way of hysteresis band PWM strategies. In hysteresis band PWM strategies output present day follows the reference and cutting-edge and is inside the constant hysteresis band.

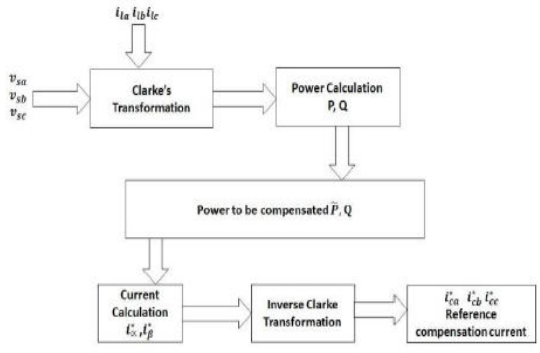

Fig 3.2 Flow chart of Shunt APF control technique

4 SIMULATION END RESULT:

modern harmonic repayment and voltage sag mitigation

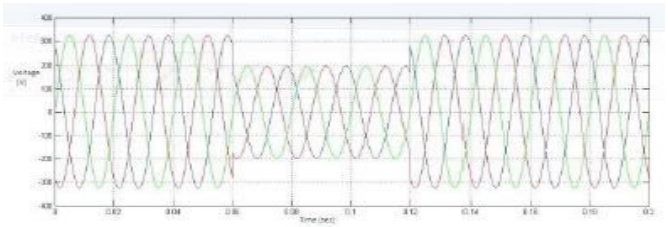

Fig 4.1 Source voltage during sag of UPQC

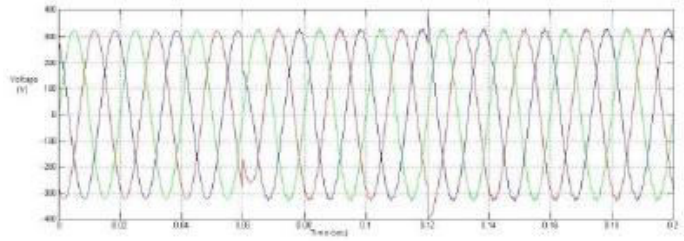

Fig 4.2 Load voltage during sag after application of UPQC

4.1 Current Harmonics compensation and voltage swell mitigation

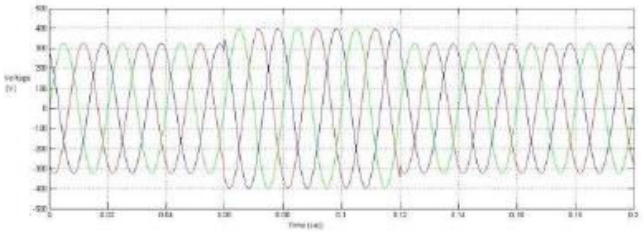

Fig 4.1.1 Source voltage of UPQC during swell

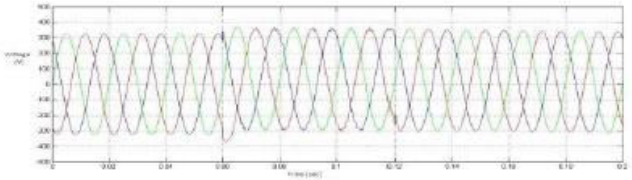

Fig 4.1.2 Load voltage of UPQC during swell

CONCLUSION :

Unified pleasant conditioner turned into studied and investigated in this thesis for

strength exceptional enrichement. UPQC is a sort of enhance hybrid clear out which makes use of collection APF for removal of voltage realted problmes like voltage dip/upward thrust, fluctutaion, imbalance and shunt APF for elimination of harmonics in contemporary harmonics.What sort of problems are there in energy best turned into studied and discussed. UPQC gadget is advanced and discussed in detail. The simulink models of Shunt APF , collection APF, UPQC are developed. Shunt APF model is evolved the use of "p-q concept" and manipulate strategies used right here is hystersis current controller. The simulation is finished and contemporary harmonics are eliminated and cutting-edge drawn from supply is absolutely sinusoidal. The THD of source present day is inside the restriction this is 5%. series APF version is advanced the use of Park's transformation and controlling techniques used are hystersis voltage controller. The simulation is done and source voltage dip/upward thrust are mitigated and load voltage is made comletely balanced. UPQC version was developed by means of becoming a member of Shunt APF and collection APF again to lower back the usage of DC capacitor. The controlling strategies used right here are hystersis band controller. The simuation is performed and cutting-edge harmonics are eliminated and supply modern is complerely sinusoidal. And the voltage dip/upward thrust in supply aspect is mitigated and cargo voltage is flawlessly balanced. The THD of supply modern-day is inside the limit that is lees than 5%.

REFERENCES :

[1] H. Akagi, "Trends in active line conditioner", IEEE Transactions On Power Electronics, vol.9, no.3, 1994.

[2] H. Fujita and H. Akagi, " The Unified Power Quality Conditioner : The integration of series and shunt active filters" IEEE Transactions on Power Electronics, vol.13, no.2 March 1998.

[3] N. Hingorani, "Introducing Custom Power," IEEE Spectrum, Vol.32, Issue: 6, June 1995,pp 41-48.

[4] H. Awad, M. H.J Bollen, "Power Electronics for Power Quality Improvements," IEEE Symposium on Industrial Electronics, 2003, vol.2, pp. 1129-1136

[5] Bhim Singh, Kamal Al-Haddad and Ambrish Chandra , "A Review of Active Filters for Power Quality Improvement" IEEE Trans. on Industrial Electronics, Vol.46, No.5, oct. 1999, pp.960-971..

(6] H. Akagi, Y. Kanazawa, A. Nabae , "Generalized Theory of the Instantaneous Reactive Power in Three Phase Circuits", in Proeedings. IPEC-Tokyo'83 International Conf. Power Electronics, Tokyo,.pp.1375-1386.

[7] H. Akagi, Y. Kanazawa, and A. Nabae, "Instantaneous reactive power compensators comprising switching devices without energy storage components," IEEE Transactions Industry Applications, vol. IA-20, pp. 625-30, May/June 1984. [8] E. H. Watanabe, R. M. Stephen, and M. Arcdes, "New concept of instantaneous active and reactive powers in electric systems with generic load," IEEE Transactions. on Power Delivery, vol.8, April 1993, pp 697-703.

[9] Rosli Omar, Nasrudin Abd Rahim, Marizan sulaiman "Modeling and Simulation for voltage sags/swells mitigation using dynamic voltage restorer (DVR)" IEEE journal on Power Electronics Drives and Energy System.

[10] M. A. Chaudhari and Chandraprakash, "Three-Phase Series Active Power Filter as Power Quality Conditioner," IEEE International Conference on Power Electronics, Drives and Energy Systems, Dec. 2012, pp 1-6. 62

[11] A. Banerji, S. K. Biswas, B. Singh, "DSTATCOM Control Algorithms: A Review," International Journal of Power Electronics and Drive System (IJPEDS), Vol.2, No.3, September 2012, pp 285-296.

[12] Mehmet Ucar and Engin Ozdemir, "Control of a 3-phase 4-leg active power filter under non-ideal mains voltage condition," Electric Power Systems Research 78 (2008) 58–73.

[13] Srinivas Bhaskar Karanki, Mahesh K. Mishra,B. Kalyan Kumar,"Particle Swarm Optimization Based Feedback Controller for Unified Power-Quality Conditioner", "IEEE Transactions on Power Delivery, vol. 25, no. 4, October 2010".

[14] Vasudhra Mahajan, Pramod Agarwal, Hri Om Gupta "Simulation of shunt active power filter using Instantaneous Power Theory" IEEE conference on Applied Power Electronics.

[15] Matin Kesler, Angin Ozadmir, "Synchronous Reference Frame based Control method of UPQC under balanced and distorted load conditions", IEEE Transactions on Industrial Electronics, vol.58, no.9, sep 2011.

[16] Bhim Singh, Kamal Al-Haddad and Ambrish Chandra , "A Review of Active Filters for Power Quality Improvement" IEEE Transactions on Industrial Electronics, Vol.46, No.5, oct 1999, pp 960-971.

[17] Fang Zheng Peng,and Jih-Sheng, "Generalized Instantaneous Reactive Power Theory for Three phase Power Systems"IEEE Transactions on Instrumentation and Measurement, vol. 45, no. 1, February 1996.

[18] Yash Pal, A. Swarup, Bhim Singh, "A control strategy based on UTT and Ic of three-phase, fourwire UPQC for power quality improvement " International Journal of Engineering, Science and Technology Vol. 3, No. 1, 2011, pp. 30-40.

[19] Metin Kesler and Engin Ozdemir, "A Novel Control Method for Unified Power Quality Conditioner(UPQC) Under Non-Ideal Mains Voltage and Unbalanced Load Conditions," IEEE Conference on Applied Power Electronics, Feb. 2010, pp. 374-379.

[20] Sai Shankar, Ashwani kumar and W.Gao "Operation of Unified Power Quality Conditioner under Different Situation," IEEE Proceedings Power and Energy Society General Meeting, July 2011, 21, pp. 1-10. 63

[21] Chellali Benachaiba, Brahim Ferdi ,"Voltage Quality Improvement Using DVR," Electrical Power Quality and Utilisation, Journal Vol. XIV, No. 1, 2008.

[22] F. A. Jowder, "Modeling and Simulation of Dynamic Voltage Restorer (DVR) Based on Hysteresis Voltage Control," The 33rd Annual Conference of the IEEE Industrial Electronics Society (IECON) Nov. 2007.

[23] F.A.L. Jowder , "Design and Analysis of dynamic voltage restorer for deep voltage sag and harmonic compensation" ,IET Generation, Transmission & Distribution,2009,Vol.3,Iss. 6, pp. 547-560.

[24] V.Khadkikar, A.Chandra, A.O. Barry and T.D.Nguyen, "Conceptual Study of Unified Power Quality Conditioner (UPQC)," IEEE International Symposium on Industrial Electronics,vol.2, July 2006.