(1)

V/F control of Three Phase Induction Motor Drive with Different PWM Techniques

Gaber El-Saady, El-Nobi A.Ibrahim, Mohamed Elbesealy

Abstract:

This paper presents a v/f control of induction motor with different pulse width modulation (PWM) techniques as sine triangle pulse width modulation (SPWM), Third-harmonic pulse width modulation (THPWM) and Space vector pulse width modulation(SVPWM) using MATLAB SIMULINK. Induction motor modeled in the synchronous q-d reference frame. The performance of IM with full load torque is compared using these techniques for THD, harmonics spectra, utilization of dc supply voltage, fundamental peak of the output voltage and motor speed. The dynamic performance of IM using SVPWM under reference speed and load torque variations is studied also. The results show that the SVPWM is the efficient one because it s superior performance characteristics. The operation of IM with v/f method for closed loop system is enhancement when SVPWM technique is applied.

Keywords:

Space vector modulation, SPWM, V/f control, Harmonic injection.

Published In:

Innovative Systems Design and Engineering , Vol.4, No.14, 2013 ,

(2)

-TRANSIENT STABILITY IMPROVEMENT OF MULTI MACHINE POWER SYSTEM USING UPFC TUNED-BASED PHASE ANGLE PARTICLE SWARM OPTIMIZATION

G. El-Saady, A. Ahmed, EL Noby and M. A. Mohammed

Abstract:

Optimal computation of parameters and placement of UPFC based minimization of New Voltage Stability Index (NVSI) are presented in this paper. The application of Unified Power Flow Controller (UPFC) to enhance transient stability of a multi-machine power system is listed. A supplementary stabilizer based on UPFC (like power system stabilizer) is designed to reach the defined purpose. Phase Angle Particle Swarm Algorithm (-PSO) is usedas an optimization method. Several nonlinear time-domain simulation tests visibly show UPFC capability in damping of power system oscillations and consequently transient stability betterment. Comparisons based system transient stability enhancement among different UPFC locations and parameters are introduced. The effectiveness of the proposed method is analyzed with IEEE 14-bus and IEEE 30-bus test systems.

Keywords:

Flexible AC Transmission System (FACTS), Unified Power Flow Controller (UPFC), Transient Stability, New Voltage Stability Index (NVSI), Phase Angle Particle Swarm Optimization (-PSO), Lead-Lag Power System Stabilizer (PSS), PI controllers.

Published In:

Journal of Engineering Sciences Assiut University Faculty of Engineering , 42-3 , 722745

(3)

DESIGN AND SIMULATION OF SHUNT ACTIVE POWER FILTER FOR ASSIUT CEMENT COMPANY DC MOTOR DRIVE

Gaber EL-Saady, EL-Noby A. Ibrahim and Mohamed Amin

Abstract:

This paper introduces a design and simulation of an adaptive shunt active power filter (APF) for harmonic mitigation and power factor (PF) correction of 630 kW DC motor (DCM) drive (called By Pass Motor Fan in production line # 2 in Assiut cement company). Due to the presence of power thyristor converters, a very bad PF and different harmonic components exist in the system, especially in the input current to the DCM drive. All measurements needed for complete analysis at the Medium Voltage (MV) supply source side and at Low Voltage (LV) motor drive side are performed using professional power quality (PQ) analysers and their associated software programs. The studied system is modelled and simulated using MATLAB Simulink software. The instantaneous active and reactive current components id and iq control method is used in this study to drive the shunt active filter. Therefore the harmonic contents at MV supply source and at point of common coupling (PCC) with the DCM drive are reduced to the standard values. Both digital simulation and practical measurements are presented and consistent. The results show that a good dynamic and steady-state performance of the system is achieved

Keywords:

Active power filter, DC motor, harmonics mitigation, power factor correction and power quality

Published In:

Journal of Engineering Sciences, Assiut University, Faculty of Engineering , 41-6 , 2244 - 2259

(4)

An Improved V/F Control for High Performance Three Phase Induction Motor Drive

G.El-Saady, El-Nobi A. Ibrahim, Mohamed Elbesealy

Abstract:

The constant v/f control method is one of the most common speed control methods for Induction motors (IMs). In this paper the performance of constant v/f control method is improved by full compensation of the stator resistance voltage drop by the injection of low frequency boost voltage to achieve the rated torque speed characteristic at any speed below rated speed. Also simple frequency compensation based on estimation of air-gap power and a linear motor torque speed approximation is introduced. The dynamic performance of IM for proposed system is studied by MATLAB/SIMULINK under different load and speed variations. Further the proposed system is compared with the previous work. The simulation results show that the speed accuracy of the proposed method is improved effectively, even at low speed.

Keywords:

v/f control, constant flux, slip frequency compensation, torque and speed.

Published In:

16th International Middle- East Power Systems Conference -MEPCON'2014 , ,

(5)

Modeling and Maximum Power Point Tracking with Ripple Control of Photovoltaic System

G.El-Saady, El-Nobi A.Ibrahim, Mostafa Ahmed

Abstract:

Abstract - This paper presents parameters determination of photovoltaic (PV) module based on data-sheet parameters using Newton-Raphson iterative method. The characteristic of photovoltaic module are drawn based on the extracted parameters. Simulation and maximum power point tracking (MPPT) are developed using Matlab/Simulink. Incremental conductance (INC) method for MPPT is used to control a dc-dc boost converter with resistive load. Parameters of boost converter are designed to operate in continuous conduction mode. State- space averaging technique is used to control standalone PV module and obtain inductance value for certain amount of ripple in boost inductor current at different temperature and irradiance conditions.

Keywords:

photovoltaic module, MPPT, INC algorithm and state-space averaging

Published In:

16th International Middle- East Power Systems Conference -MEPCON'2014 , ,

(6)

OPTIMAL PHOTOVOLTAIC WATER PUMPING SYSTEM PERFORMANCE UNDER DIFFERENT OPERATING CONDITIONS

G. El-Saady , El-Nobi A. Ibrahim , Mostafa Ahmed

Abstract:

This paper presents dc photovoltaic pumping system. The system consists of photovoltaic (PV) generator, boost converter and permanent magnet (PM) dc motor-pump set. Each part of the system is modelled. Photovoltaic generator parameters are extracted based on data-sheet parameters. Boost converter is designed to operate in continuous conduction mode (CCM) and controlled using incremental conductance (IC) algorithm for maximum power point tracking (MPPT).The system is simulated using Matlab/Simulink. The proposed system is studied under direct coupling and maximum power point tracking conditions. The results show a very good performance MPPT compared with direct coupling. The system is tested under varying conditions of temperature and radiation.

Keywords:

PV generator, pumping system, dc-dc boost converter and MPPT

Published In:

Journal of Engineering Sciences Assiut University Faculty of Engineering , Vol. 43, No. 1 , 16-32

(7)

Dynamic Stability Enhancement for Multi-Machine Power System by Coordinated Design of PSS and SSSC

G. El-Saady, El-Nobi A. Ibrahim, Alaaeldin M. AbdelsShafy

Abstract:

Damping of inter-area power system oscillation is detrimental to the goals of maximum power transfer and optimal power system security. In this paper, individual and coordinated optimization of parameters for both static series synchronous compensator (SSSC) based damping controller and power system stabilizer (PSS) to enhance the power system damping are presented. A lead-lag stabilizer is used to demonstrate this technique. An optimization method based on simulated annealing (SA) algorithm is used for optimal parameters design of the SSSC stabilizer and PSS to improve the dynamic stability of the power system. Eigenvalue analysis is carried out to assess the effectiveness of the proposed stabilizers on enhancing the electromechanical mode stability. The effect of SSSC based stabilizers on damping inter-area oscillations for a small disturbance are studied and compared with PSS. Obtained results include eigenvalue analysis and non-linear time simulation for two area multi-machine power systems.

Keywords:

Dynamic stability, Simulated annealing, SSSC, PSS, Inter-area oscillation

Published In:

17th International Middle-East Power System Conference (MEPCON'15) Mansoura University, Egypt, December 15-17, 2015 , NULL , NULL

(8)

MPPT Based on Power Mapping and Frequency Derivative

Gaber El-saady,El-nobi A.Ibrahim and Mahmoud Gelany

Abstract:

NULL

Keywords:

variable-speed wind turbine ; permanent magnet synchronous generator ; maximum power point tracking

Published In:

Innovative Systems Design and Engineering , Vol.4, No.15, 2013 , pp.110_125

(9)

Simulated Annealing Modeling and Analog MPPT Simulation for Standalone Photovoltaic Arrays

Mohamed EL-Hendawi, G.El-Saady and El-Nobi A.Ibrahim

Abstract:

This paper proposes a method for modeling and simulation of photovoltaic arrays. The method is used to obtain the parameters of the array model using its datasheet information. To reduce computational time, the input parameters are reduced to four and the values of shunt resistance Rp and series resistance Rs are estimated by simulated annealing optimization method. Then we draw I-V and P-V curves at different irradiance levels. Lowcomplexityanalogue MPPT circuit can be developed by using two voltage approximation lines (VALs) that approximate the maximum power point (MPP) locus.In this paper, a fast and low-cost analog MPPT method for low power PVsystems is proposed.The Simulation results coincide with experimental results at different PV systems to validate the powerful of the proposed method.

Keywords:

PV module, simulated annealing, MPP, VAL.

Published In:

International Journal on Power Engineering and Energy (IJPEE) , vol. 4, no. January , 353360

(10)

Analysis of Wind Turbine Driven Permanent Magnet Synchronous Generator under Different Loading Conditions

Gaber El-Saady, El-Nobi A.Ibrahim, Hamdy Ziedan and Mohammed M. Soliman

Abstract:

This paper proposes the configuration of a wind turbine generating system equipped with Permanent Magnet Synchronous Generator (PMSG). There are different types of synchronous generators, but the PMSG is chosen which has better performance due to higher efficiency and less maintenance. Since it can be used without a gearbox also implies a reduction of the weight of the nacelle and a reduction of costs. The model includes a wind turbine model, drive train model and PMSG model. The equations that explain their behavior have been introduced. The generator model is established in the d-q synchronous rotating reference frame. The proposed Wind Turbine Generator System (WTGS) has been implemented in Matlab/Simulink software. The PMSG is operating in stand-alone which is loaded with different types of loads. The simulation results indicate the ability of wind driven PMSG to operate over wide range of operating conditions at different loading conditions and show effect of different load types in operation.

Keywords:

Permanent Magnet Synchronous Generator (PMSG), Wind Turbine, Wind Energy and WTGS

Published In:

Innovative Systems Design and Engineering , Vol.4, No.14 , pp. 97-111

(11)

Analysis of Wind Turbine Driven Permanent Magnet Synchronous Generator under Different Loading Conditions

Gaber El-Saady, El-Nobi A.Ibrahim, Hamdy Ziedan and Mohammed M. Soliman

Abstract:

This paper proposes the configuration of a wind turbine generating system equipped with permanent magnet synchronous generator (PMSG). There are different types of synchronous generators, but the PMSG is chosen in order to obtain its model. It offers better performance due to higher efficiency and less maintenance since it does not have rotor current and can be used without a gearbox, which also implies a reduction of the weight of the nacelle and a reduction of costs. Wind turbine and drive train have been modelled and the equations that explain their behaviour have been introduced. The generator model is established in the dq synchronous rotating reference frame. The PMSG is operating in stand-alone which is loaded with different types of loads. The proposed system has been implemented in MATLAB /SIMULINK software.

Keywords:

Permanent Magnet Synchronous Generator(PMSG), Wind Turbine, Modeling, WTGS simulation and modeling.

Published In:

16th International Middle- East Power Systems Conference -MEPCON'2014 , . , .

(12)

Modeling and Operation of Permanent Magnet Synchronous Generator Wind Energy Conversion System Connected with Grid

Gaber El-Saady, El-Nobi A. Ibrahim, Hamdy Ziedan and Mohammed M. Soliman

Abstract:

Wind is one of the most distinguished renewable sources of energy. Wind Energy Conversion System (WECS) is based on a variable speed wind turbine with direct driven Permanent Magnet Synchronous Generator (PMSG). WECS transmits its electrical power to an AC grid using advanced power electronic converter system. The modelling and operation of a grid connected wind generation system based on a gearless PMSG is being studied. Implementation of the machine side converter control strategy develop a maximum power point tracking (MPPT) method using direct driven PMSG. The grid side converter is used to control active and reactive powers injected into the grid and maintaining the dc link voltage constant.The PMSG is connected to the grid by means of a fully controlled back-to-back converter with a voltage source inverter (VSI) which consists of a pulse width modulation (PWM) and an intermediate DC link circuit. DC-Link Over-Voltage protection Scheme is used to protect the system under fault conditions. The effect of change wind speed and faults on the operation is being studied in this paper. The modeling of wind power generation system with PMSG and power electronic converter interface along with the control scheme is implemented using a MATLAB/SIMULINK simulation package.

Keywords:

Permanent Magnet Synchronous Generator (PMSG), WECS, Fully controlled back-to-back converter, PWM, Voltage Source Inverter, MPPT

Published In:

17th International Middle East Power Systems Conference , . , .

(13)

Performance of Photovoltaic Water Pumping System Under Different MPPT Algorithms

G.El-Saady El-Nobi A.Ibrahim Mostafa Ahmed

Abstract:

Abstract This paper proposes an accurate model for DC photovoltaic pumping system. The system model begins with the photovoltaic module (PVM).The boost converter is used as an interfacing circuitry between the PVM and the motor. The DC motor is a permanent magnet (PM) type which coupled with a centrifugal pump. The boost converter is controlled using three different maximum power point tracking (MPPT) algorithms to extract the available power under changing conditions of radiation. Optimal duty cycle required to drive the boost converter is obtained using graphical steady state analysis. Further the system is built using Matlab/Simulink and tested with different atmospheric conditions.

Keywords:

Index term PV, pumping system, dc-dc boost converter and MPPT.

Published In:

International Middle-East Power System Conference , NULL , NULL

(14)

Supervisory Controller for Power Management of AC/DC Microgrid

Hossam A. Gabbar, Mohamed El-Hendawi, G.El-Saady, El-Nobi A. Ibrahim

Abstract:

This paper proposes a hybrid AC/DC micro grid to reduce the processes of multiple conversions in an individual AC or DC micro-grid. The hybrid grid consists of both AC and DC networks connected together by a bidirectional AC/DC converter. Wind generator, AC loads, and utility are connected to the AC bus whereas PV system and DC loads are tied to the DC bus. The coordination control algorithms of supervisor controller are proposed for smooth power transfer between AC and DC links and for stable system operation under various generation and load conditions. In this paper, a flexible supervisor controller is developed for a hybrid AC/DC microgrid, where the power flow in the micro-grid is supervised based on demanded power with maximum utilization of renewable resources. A small hybrid micro-grid has been modeled and simulated using the Simulink in the MATLAB. The simulation results show that the system can maintain stable under load variations.

Keywords:

Hybrid AC/DC micro-grid; supervisor controller; BIC; MPPT; PV system; wind generation

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the 4th IEEE International Conference on Smart Energy Grid Engineering , NULL , 147152

(15)
Voltage Regulation of Stand-Alone Variable Speed Wind Energy SystemG.

G.El-Saady, El-Nobi A.Ibrahim and Mahmoud Gelany

Abstract:

This paper presents simple control of a variable speed stand-alone wind turbine with a permanent magnet This paper presents simple control of a variable speed stand-alone wind turbine with a permanent magnet synchronous generator (PMSG) to get constant voltage. The system consists of wind turbine, PMSG, un controlled rectifier and voltage source inverter using PI control. The parameters of PI control are calculated by using try and error method. The system is modified by using a switch mode rectifier and a voltage source inverter between the PMSG and a three phase loads. The loads that used are resistive, inductive and capacitive loads. By adjusting the parameters of a buck converter, we get a good result. Results have been done using PSIM/SIMULINK. generator (PMSG) to get constant voltage. The system consists of wind turbine, PMSG, un controlled rectifier and voltage source inverter using PI control. The parameters of PI control are calculated by using try and error method. The system is modified by using a switch mode rectifier and a voltage source inverter between the PMSG and a three phase loads. The loads that used are resistive, inductive and capacitive loads. By adjusting the parameters of a buck converter, we get a good result. Results have been done using PSIM/SIMULINK.

Keywords:

stand-alone, wind turbine, PMSG, switch mode rectifier, voltage source inverter and controlled output voltage.

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Eighteenth International Middle East Power Systems Conference (MEPCON) , 18th International Middle East Power Systems Conference (MEPCON) , PP.360-366

(16)

Sequential Technique Based AC-DC Power Flow Analysis for Medium and Long Transmission Systems

G.El-Saady, El-NobiA.Ibrahim, Ahmed H.Okilly

Abstract:

The modern electric utility industry is currently more and more attention to HVDC transmission as a practical alternative to HVAC transmission. It is useful supplement to rapid and smooth power flow control, more economical choice and small power loss for long transmission systems. An electric power system with DC links requires a special analysis for power flow study that takes their characteristics into account. This paper presents an AC-DC load flow algorithm to solve a power flow problem with DC links. This algorithm is tested using medium and long transmission standard test systems. Digital results using the proposed sequential method are compared w ith a previous work. The effect of load change in HVDC control parameters is studied. A comparison between HVAC and HVDC transmission systems based on power losses are also performed.

Keywords:

HVDC, sequential method, load flow AC-DC, power losses, load change, MATLAB SIMULINK.

Published In:

Middle East Power System (MEPCON) Conference, Egypt, Dec 2015. , NULL , NULL

(17)
Analysis and Control of HVDC Transmission Power System

G.El-Saady, El-Nobi A.Ibrahim Ahmed H.Okilly

Abstract:

This paper presents a design of converter controllers and filters of Line Commutated Converter High voltage direct current (LCC-HVDC) power transmission system to increase loadability and reliability of long power transmission. Also the proposed tuned PI controllers for HVDC Converters are verified in sense of HVDC transmissionsystem performance and reliability. The studied system performances are compared with HVAC transmission systems in terms of power transfer quantity and reliability for a wide range of transmission distances and operating conditions. The Power Quality of HVDC transmission system is studied with Filters and proposed PI controllers .The two transmission systems (HVDC & HVAC) are simulated using MATLAB SIMULINK software package. With the control strategy, the HVDC system can provide a useful and economical way to transmit electric power over the long distance compared with HVAC system.

Keywords:

LCC_HVDC, HVAC, modeling, steady state, power losses, harmonic analysis, MATLAB SIMULINK

Published In:

Power Systems Conference (MEPCON), 2016 Eighteenth International Middle East, pp. 190-198, IEEE, Dec 2016. , 978-1-4673-9063-7/16/$31.00 ©2016 IEEE , NULL

(18)

HVDC FACTS Controller for Load Frequency Control System

G.El-Saady, El-Nobi A.Ibrahim, Ahmed H.Okilly

Abstract:

Power system frequency deviation is always presented result to the continuous loads variation, thus leading to build the load frequency control (LFC) systems. In this paper, HVDC systems are used to suppression such this frequency oscillations which occur result to load variation between two-area interconnected systems. A comparative evaluation between HVDC and superconducting magnetic energy storage (SMES) are introduced in this paper to make a comparative study between different controllers to improve the dynamic performances of the power system. Two-Area Power system with AC/DC parallel tie lines is simulated and then it is subjected to different disturbances. Responses of frequencies deviation, AC tie line powers deviation and area control errors have been plotted for two areas. The system Dynamic performance using HVDC FACTS Controller is superior with fast response and less overshoot/undershoot.

Keywords:

loads variation, LFC, dynamic, PI, HVDC, SMES

Published In:

2017 Fourth International Conference on Energy Engineering (ICEE-4) , NULL , NULL

Hybrid PD-Fuzzy position controller for linear switched reluctance motor with online fuzzy logic gain scheduling of PD

El-Saady,G., Ibrahim,E,N.A., Abuelhamd,M

Abstract:

NULL

Keywords:

NULL

Published In:

IEEE conferences , NULL , pp.830-838

(20)

Enhanced MG with optimum operational cost of pumping water distribution systems

El-Hendawi,M., Gabbar,H.A., El-Saady,G., Ibrahim,E.N.A

Abstract:

NULL

Keywords:

NULL

Published In:

5th IEEE International Conference on Smart Energy Grid Engineering, SEGE , NULL , pp.137-142

(21)

Power quality improvement of photovoltaic water pumping system using LC filter

Moubarak,A, El-saady,G., Ibrahim,E.A

Abstract:

NULL

Keywords:

NULL

Published In:

ARPN Journal of Engineering and applied sciences , 13, 4 , pp.1311-1326.

(22)

Active power filter for variable-speed wind turbine PMSG interfaced to grid and non-linear load via three phase matrix converter

Mohamed Amin M.A. Mofath, Gaber El-Saady, El-Noby A. Ibrahim

Abstract:

NULL

Keywords:

NULL

Published In:

Eigtheenth International Middle East power system conference (MEPCON) ,IEEE conferences , NULL , pp.1013-1019

(23)

Active power filter for power quality enhancement of photovoltaic renewable energy systems

Mohamed Amin M.A. Mofath, Gaber El-Saady, El-Noby A. Ibrahim

Abstract:

NULL

Keywords:

NULL

Published In:

2016 saudi Arabia Smart Grid (SASG), IEEE Conferences, , NULL , pp.1-9

(24)

Hybrid PD-Fuzzy controller for high performance linear switched reluctance motor under different operating conditions

El-Saady,G., Ibrahim,E,N.A., Abuelhamd,M.

Abstract:

NULL

Keywords:

NULL

Published In:

MEPCON'18, Proceedings 7836928 , NULL , pp.437-444

Control and EMS of a grid-connected microgrid with economical analysis

El-Hendawi, Mohamed; Gabbar, Hossam A.; El-Saady, Gaber; Ibrahim, El-Nobi A.

Abstract:

NULL

Keywords:

NULL

Published In:

Energies , NULL , v 11, n 1