Adaptive var control for distribution circuits with photovoltaic generators

Can an adaptive control algorithm improve the performance of distributed reactive power control?
Abstract: We show how an adaptive control algorithm can improve the performance of distributed reactive power controlin a radial distribution circuit with a high penetration of photovoltaic (PV) cells. The adaptive algorithm is designed to balance the need for power quality (voltage regulation) with the desire to minimize power loss.

Does adaptive VAR control provide better voltage performance than a capacitor?
The proposed methodology for optimal placement of PV-DG units based on reactive power control has a better voltage profile than Ref. ,in which combined DG at unity power factor and a capacitor are optimally placed. It can be concluded that the adaptive VAR control can provide better voltage performance than a capacitor.

What is adaptive reactive power control in PV-DG allocation?
An adaptive reactive power control model is introduced in PV-DG allocation as to balance the trade-off between the improvement of voltage quality and the minimization of power loss in a distribution network integrated with PV-DG units.

What is adaptive VAR control strategy?
The adaptive VAR control strategy is proposed as a strategy other than a control system model to determine the optimum value of reactive power output. The technical effects of realistic fluctuations of solar irradiance on the placement of PV-DG can be obtained, as long as the sample size is large enough.

How to plan radial distribution networks with PV-DG and without VAR source?
The hybrid intelligent algorithmis used for planning the radial distribution networks with PV-DG and without VAR source. The proposed method is used here to plan the IEEE 33-bus system with multiple PV-DG units and VAR sources simultaneously considering the adaptive reactive power control algorithm.

Why should you choose a PV-DG inverter?
The PV-DG inverter can generate reactive power at a much faster timescale and with a much finer resolution than shunt capacitors . We employ a VAR control strategy to balance the need for the voltage profile of the grid-connected nodes with the desire to minimize the real power loss.

This paper proposes a hybrid voltage/var control (VVC) architecture for distribution systems with a high PV penetration. The architecture consists of two control loops: coordinated normal control ...

Adaptive VAR control for distribution circuits with photovoltaic generators IEEE Trans Power Syst, 27 (2012), pp. 1656 - 1663, 10.1109/TPWRS.2012.2183151 View in Scopus Google Scholar

Adaptive var control for distribution circuits with photovoltaic generators

Optimal allocation and adaptive VAR control of PV-DG in distribution networks Xueqian Fua, Haoyong Chena,b,?, Runqing Caic, Ping Yanga a School of Electric Power, South China University of Technology, China bAsia-Pacific Research Institute of Smart Grid and Renewable Energy, Hong Kong cGuangzhou Power Supply Co. Ltd., China highlights A methodology for ...

This feature brings technical challenges to distribution network operation such as over-voltage at connection nodes and voltage fluctuations caused by intermittent power injections . To deal with the above issues, ...

This paper proposes a hybrid voltage/var control (VVC) architecture for distribution systems with a high PV penetration. The architecture consists of two control loops: coordinated normal control loop and uncoordinated transient cloud movement control loop. In the first loop, hourly dispatches are scheduled for on-load tap changer (OLTC), capacitor banks (CBs), and ...

[27] presents an adaptive reactive power control algorithm to improve voltage profile and reduce system loss in a radial distribution circuit with photovoltaic cells. In this paper, We develop a new model for PV-DG optimal allocation considering the randomness of solar energy based on chance-constrained programming theory, in which takes the ...

Modern distribution networks face an increasing number of challenges in maintaining balanced grid voltages because of the rapid increase in single-phase distributed generators. Because of the proliferation of inverter-based resources, such as photovoltaic (PV) resources, in distribution networks, a novel method is proposed for mitigating voltage ...

Adaptive VAR control for distribution circuits with photovoltaic generators. HG Yeh, DF Gayme, SH Low. IEEE Transactions on Power Systems 27 (3), ... Wavelet and denoising techniques for real-time HIF detection in 12-kV distribution circuits. HG Yeh, S Sim, RJ Bravo. IEEE Systems Journal 13 (4), 4365-4373, 2019. 31:

We show how an adaptive control algorithm can improve the performance of distributed reactive power control in a radial distribution circuit with a high penetration of photovoltaic (PV) cells.

A local control scheme that dispatches reactive power from each PV inverter based on local instantaneous measurements of the real and reactive components of the consumed power and the real power generated by the PVs is suggested. High penetration levels of distributed photovoltaic (PV) generation on an electrical distribution circuit may degrade power ...

The MPC-based VVO problem is formulated as a mixed-integer nonlinear program with reduced scenarios and the exponential load model is used to capture the various load behaviors in this paper. This paper proposes a model predictive control (MPC)-based voltage/var optimization (VVO) technique considering the integration of distributed generators and load-to ...

Adaptive var control for distribution circuits with photovoltaic generators

TL;DR: In this paper, an adaptive control algorithm is proposed to balance the need for power quality (voltage regulation) with the desire to minimize power loss in a radial ...

The high-penetration of Distributed Energy Resources (DER) in low voltage distribution grids, mainly photovoltaics (PV), might lead to overvoltage in the point of common coupling, thus, limiting the entrance of renewable sources to fulfill the requirements from the network operator. Volt-var is a common control function for DER power converters that is used ...

This feature brings technical challenges to distribution network operation such as over-voltage at connection nodes and voltage fluctuations caused by intermittent power injections . To deal with the above issues, voltage/VAR regulation (VVR) for high PV-penetrated distribution networks has been increasingly applied.

With the increasing scale of distributed generations connected to active distribution network, voltage/var control of distribution network is facing more and more technical challenges. In this paper, under the background of photovoltaic high-permeability distribution network, a three-stage voltage/Var control (VVC) is adopted to optimize the active power loss and voltage level ...

Adaptive VAR Control for Distribution Circuits With Photovoltaic Generators. HG Yeh, DF Gayme, SH Low. Power Systems, IEEE Transactions on 27 (3), 1656 - 1663, 2012. 528: 2012: Optimal power flow with large-scale energy storage integration. D Gayme, U Topcu. IEEE Transactions on Power Systems 28 (2), 709 - 717, 2013.

With the increasing penetration of photovoltaics (PVs) in distribution networks, PV inverters and capacitor banks (CBs) should be well utilized for volt/var control and tackle fluctuations and ...

A complete adaptive sequential strategy for VAR control in distribution networks with solar energy is developed and it is shown that the two-way switch works well in balancing the user needs for the purpose of minimizing voltage variation and power loss in order to gain higher energy savings over a specified time duration. Increasing penetration of photovoltaic can ...

It is found that local control schemes are able to maintain voltage within acceptable bounds and how the control system can be continuously tuned between robust voltage control, suitable for daytime operation when circuit conditions can change rapidly, and loss minimization better suited for nighttime operation. High-penetration levels of distributed photovoltaic (PV) ...

Voltage/VAR regulation (VVR) implemented by capacitor banks (CBs), on-load tap changers (OLTCs), and photovoltaic (PV)-associated inverters is effective to enhance voltage stability and reduce power loss. On the other hand, conservation voltage reduction (CVR) has been widely adopted in distribution networks to reduce load demand.

Adaptive var control for distribution circuits with photovoltaic generators

A load-weighted voltage deviation index (LVDI) is proposed to quantify network voltage deviation to obtain robust Pareto solutions under uncertainties and a multi-objective adaptive voltage/VAR control (VVC) framework which coordinates multiple devices in multiple timescales to minimize voltage deviation and power loss simultaneously is proposed. In active ...

This paper proposes a hybrid voltage/var control (VVC) architecture for distribution systems with a high PV penetration. The architecture consists of two control loops: coordinated normal control loop and uncoordinated transient cloud movement control loop. In the first loop, hourly dispatches are scheduled for on-load tap changer (OLTC), capacitor banks (CBs), and static var ...

Buy the article: Adaptive VAR Control for Distribution Circuits with Photovoltaic Generators. Top. Search. Home > Section 82 > Chapter 81,523. Adaptive VAR Control for Distribution Circuits with Photovoltaic Generators Yeh, H.; Gayme, D.F.; Low, S.H. IEEE Transactions on Power Systems 27(3): 1656-1663 ...

Web: https://ekusenitours.co.za