

cally on a 1 MW wind turbine. The proposed method causes smaller grid power quality impact, especially on inductive grids, compared with soft starters. This means that it will be possible to install constant-speed wind turbines to weaker grids utilizing this method.

Keywords: Wind energy, power quality, capacitors, resistors.

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Discussion Deadline: December 2002

Conversion of Unused Heat Energy to Electricity by Means of Thermoelectric Generation in Condenser

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Abstract: Thermoelectric power generation has the potential to recover a large amount of energy loss at the vapor condensers in the steam-based power plants. A suitable arrangement of thermoelectric modules was designed from the heat transfer theory in the cylindrical heat exchanger. Even under the practical operation limits, 150 kW can be generated by the thermoelectric conversion.

Keywords: Thermoelectric energy conversion, surface condenser, steam-based power plants.

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Insulated Conductors

Results of Partial Discharge Measurements in a Long-Distance 275 kV GIL

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Abstract: In this paper we introduce a newly developed measuring system for partial discharges (PD) in after-laying tests on site for a long-distance gas insulated transmission line (GIL) in a tunnel. We evaluate the length of harmful particles for the overvoltages to be considered for the Shinmeika-Tokai GIL. The length of particles detectable by the PD sensors is compared with the length of harmful particles. The highly sensitive PD measuring system took advantage of low noise levels in the tunnel. We applied the system to the after-laying test on site and confirmed that the developed system was effective to verify the required performance of a long distance GIL in a tunnel.

Keywords: Gas insulated transmission line, partial discharges, metallic particles, measuring system, after-laying test.

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Power Engineering Education

Economic Performance of Contracts in Electricity Markets: A Fuzzy and Multiple Criteria Approach

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Abstract: In competitive electricity markets, consumers and suppliers are exposed to price risk, quantity risk, and other risks such as credit risk. These risks can be managed through an adequate portfolio of contracts. The goal of the approach proposed is to help a market player to appraise portfolios of contracts from the point of view of the economic

performance—which measures the potentiality of gains and the potentiality of losses—taking into account the multidimensional aspect of risk, the vagueness and nuances of the decision maker's preferences, and the different kinds of uncertainties. The three steps proposed are portfolio construction, portfolio evaluation, and portfolio ranking. This requires modeling of uncertainties, contracts, and the decision maker's preferences. The example of a large consumer of electric energy and a comparison with the value-at-risk system are presented. The proposed approach is applied to appraise different strategies for a Swiss utility.

Keywords: Decision making, uncertainty, risk analysis, strategic planning, contracts, power system economics, fuzzy sets.

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Power System Analysis, Computing, and Economics

Distribution Access Pricing: Application of the OFTEL Rule to a Yardstick Competition Scheme

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Abstract: This paper formulates an access-pricing model applied to electricity distribution, based on the OFTEL model, originally structured to price telecommunications monopolistic essential facilities. The aim is to achieve an optimal access price charge in an environment where a distribution network monopoly serves both regulated and nonregulated customers. The nonregulated market faces competition, therefore, the competitors must use the network to reach their customers. A usage-based hybrid model is proposed to couple with a tariff scheme for regulated customers, which uses yardstick competition. A way to set appropriated opportunity costs by the use of the OFTEL model is introduced. Finally, the paper focuses on properly recognizing both regulated distribution and competitive supply costs. The scheme is assessed within the Chilean regulatory scheme, proposing a way to establish marginal and fixed distribution costs for distribution companies.

Keywords: Power sector deregulation, access pricing, distribution pricing, distribution costs, supply costs, opportunity costs.

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Enhancement of Power System Data Debugging Using Gap Statistic Algorithm-Based Data Mining Technique

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Abstract: In this paper, a gap statistic algorithm (GSA)-based data mining technique is applied to enhance the data debugging in power system operations. In the proposed approach, the GSA technique is embedded into a neural network frame in anticipation of improving the detection capability of bad data. Thanks to the clustering capability exhibited by GSA in which the number of clusters can be optimally determined, the proposed approach becomes highly effective to localize the group of abnormal data. This proposed approach has been tested through the data collected from different scenarios made on an IEEE 30-bus system and 118-bus systems. Test results reveal the feasibility of the method for the data diagnosis applications.

Keywords: Gap statistic algorithm, data mining.

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