Application of petri net in microgrid

4.2 Control strategy of operation layer based on Petri-net. The microgrid system needs to cater to the price factor of utility energy network and the internal demand of different types of energy load, and also to deal with the impact of environmental factors on the output of renewable energy.

To resolve this issue, a novel hierarchical model of Colored Petri Net (CPN) based dynamic scheduling scheme is first proposed for a class of wind-photovoltaic-storage ...

In this paper, an energy management system for a photovoltaic based power station including storage units has been introduced. We have described states of each source ...

A fuzzy Petri net (FPN) is a powerful tool to model and analyze knowledge-based systems containing vague information. This paper systematically reviews recent developments of the FPN model from the following three perspectives: knowledge representation using FPN, reasoning mechanisms using an FPN framework, and the latest industrial ...

This work presents a methodology that can aid the DSOs in the process of design and performance analysis of IEC 61850 networks applied to microgrid context using the colored Petri net as the formal tool in order to have an easy and comprehensive modeling/simulation strategy. The increasing penetration of distributed energy resources ...

Semantic Scholar extracted view of "The energy management and economic optimization scheduling of microgrid based on Colored Petri net and Quantum-PSO algorithm" by Ximu Liu et al. ... Application of Time-Voltage Characteristics in Overcurrent Scheme to Reduce Arc-Flash Incident Energy for Safety and Reliability of Microgrid Protection.

The applications that use Petri nets and their types are diverse, present in areas such as automation processes, fault diagnosis, telecommunications, and logistics systems, as shown in the previous section.

Based on data mining and Petri net technology, we proposed an automatic micro grid process modeling method, also known as grid business mining technology. We use ...

In this study, new Hybrid Petri Net (PN) application is proposed for modelling and analyzing smart microgrid. The model presented is derived from the principle of power balance in a bus.

The making process of the coordinated switching control strategies is regarded as searching the optimal switching operation mode by means of designing constraint violation function and colour Petri-net, so that the operation mode of the microgrid can be switched during larger power unbalance.

Application of petri net in microgrid

In recent years, autonomous direct current microgrid has been widely investigated to improve its performance in terms of integrating distributed energy resources and power balance issues. In this paper, a multi-agent hybrid petri net model is developed to ensure power management in wind-solar-battery driven low-voltage direct current microgrid. The multi-agent ...

Currently, power electronics converters in microgrids have increased their application and complexity; as a result, innovative design methodologies are required. ... Petri nets are based on graphical notation to represent sequential and concurrent process. Petri nets are currently used to model and verify designs in different domains. HiLeS ...

A Timed Hybrid Petri Nets tool is proposed to model the behavior of a standalone PV/Batteries system established in an isolated chalet and results prove the satisfaction of ...

A Petri net model for the interconnection of an arbitrary number of prosumers forming a prosumer-based microgrid is derived and a systematic method to implement them via supervisory control in a least restrictive way is presented, thereby enforcing fair and efficient microgrid operation. The transformation towards renewable energy sources is a global ...

The increasing penetration of distributed energy resources (DERs) and local/small-scale power systems, named microgrids (MG), becomes a growing challenge for distribution system operators (DSOs). In general, the DER units and MG operation are based on a decentralized and time-critical decisions, which performs a complex behavior. To deal with this ...

Starting from the Petri net model of Occam which uses 1-safe PT nets, the paper develops, on the top of it, a timed net model, using Generalized Stochastic Petri Nets (GSPN), to allow a ...

DOI: 10.1016/j.asoc.2012.01.024 Corpus ID: 7382978; A fuzzy cognitive maps-petri nets energy management system for autonomous polygeneration microgrids @article{Kyriakarakos2012AFC, title={A fuzzy cognitive maps-petri nets energy management system for autonomous polygeneration microgrids}, author={George Kyriakarakos and Anastasios I. Dounis and ...

Petri Nets (PN) have been applied to model and analyze the com-plex dynamics in Smart Grid (SG) environments. However, we are currently missing an overview of types of PNs applied to ...

A derivation of Petri Net called Fluid Stochastic Petri Net is introduced in, where the reliability issue is treated again. Many of this works deal with the microgrid interactiveness, distributed systems, control/management strategies and renewable sources penetration, which shows the potential of Petri Net modeling and Monte Carlo simulation.

related to the application of PNs in this domain: (1) The areas in which Petri Nets have been applied in the

context of Smart Grids (e.g., SGs security); (2) The types of Petri Nets that are mostly applied in the Smart Grids domain (e.g., Stochastic PNs); (3) Aspects that are modeled by Petri Nets in the identified

Since wind power and photovoltaic power generation are usually affected by the external environment, to better improve the stability of the output power of wind power generation, energy storage is usually added to microgrid to enhance the stability of the power system, so this paper intends to study the wind power storage microgrid [].3.1 Direct-Drive Wind Turbines for ...

New hybrid Petri net application for modeling and analyzing complex smart microgrid system. J Eng Appl Sci, 13 (9) (2018), pp. 2713-2721. View in Scopus Google Scholar [19] Zhang B., Zhang J. A novel strategy for dynamic identification in AC/DC microgrids based on ARX and Petri nets. Heliyon, 6 (3) (2020), Article e03559-03576. Google Scholar ...

This paper proposes four fundamental research questions related to the application areas of PNs in SGs, PNs types, aspects modelled by PNs in the identified areas, and the validation methods in the evaluation. Since the energy domain is in a transformative shift towards sustainability, the integration of new technologies and smart systems into traditional ...

In microgrids, Petri Nets have been used for properties assessment, ... Two applications of cyber-power systems, automated substations and micro grids, are discussed in this paper, and certain ...

In this article, we develop a stochastic Petri net based analytical model to assess and analyze the system reliability of smart grids, specifically against topology attacks ...