Application of fuzzy logic in power system

Abstract: Fuzzy logic has emerged as a promising tool for several power system applications. A large body of the literature in this area is concerned with the stability of the electric power system and considerable effort has been directed to the development of a fuzzy logic based power system stabilizer (FLPSS). The purpose of this

Decision making support and Recommended systems: Fuzzy logic allows to find the optimal solution in cases where there are uncertain, imprecise, or incomplete data. Natural language processing systems: Fuzzy logic enables better understanding and recognize ambiguous or vague words, phrases or language constructs.

Recent advances within the field of fuzzy logic systems and variety of successful applications in electric power (wattage) systems show that logic is efficiently applied to house imprecision, ambiguity and probabilistic information in the input file to scale back the time of power outages and for the immediate restoration, the fault ...

Fuzzy logic has been used in numerous applications such as facial pattern recognition, air conditioners, washing machines, vacuum cleaners, antiskid braking systems, transmission systems, control of subway systems and unmanned helicopters, knowledge-based systems for multiobjective optimization of power systems, weather forecasting systems ...

of fuzzy logic controller, it generally comprises four principle components: fuzzification interface, knowledge base, decision making logic and defuzzification interface. If the output from the defuzzifier is not a control action for a process, then the system is a fuzzy logic decision system. The fuzzy controller itself is normally a two-

Altas and Sharaf [144] state that the fuzzy logic design proposed can also be used for other power system applications such as voltage control, power system stabilizers and speed control application. Nafeh et al. [145] have evaluated the controller performance for maximum power point tracking using conventional PI controller and fuzzy logic ...

This paper presents design of a fuzzy logic controller to prevent an electric power system to losing synchronism after a large sudden fault and to achieve good postfault voltage level. The developed fuzzy logic controller (FLC) accepts speed deviation and acceleration as inputs and generates the control signal. The simulation study is carried out based on a single machine infinite bus power ...

This book presents some recent specialized works of theoretical study in the domain of fuzzy systems. Over eight sections and fifteen chapters, the volume addresses fuzzy systems concepts and promotes them in practical applications in the following thematic areas: fuzzy mathematics, decision making, clustering, adaptive neural fuzzy inference systems, ...

with imprecision, ambiguity and probabilistic information in input data. Fuzzy logic based systems with their capability to deal with incomplete information, imprecision, and incorporation of qualitative knowledge have shown great potential for application in electric system fault detection. Key words:-Fuzzy logic, Power System, Fault diagnosis

This series of three tutorials gives practising power engineers an overview and general appreciation of the basic concepts of fuzzy logic and an insight into how this technique can be applied to solve complex power system problems. The first tutorial gives a ...

However, that approach may be inappropriate, namely when there is no available historical data in order to construct the pdf. On such cases, the fuzzy power flows (FPF) is an interesting alternative. In this paper, a methodology named Symmetric Fuzzy Power Flow is used. That methodology uses optimization models to solve power f...

The paper provides an insight to the application of fuzzy logic, in the form of a fuzzy controller, to a real power system operations problem. It is shown how fuzzy logic can deal with the complex problems posed by the reactive and active dispatch problem taking into account ...

This chapter overviews the applications of fuzzy logic in power systems. Emphasis is placed on understanding the types of uncertainties in power system problems that are well-represented by fuzzy methods. Specific examples in the areas of diagnostics and controls are used to ...

The principal components of an FLC system is a fuzzifier, a fuzzy rule base, a fuzzy knowledge base, an inference engine, and a defuzz.ifier. It also includes parameters for normalization. When the output from the defuzzifier is ...

Discussions The applications of fuzzy logic in power systems have been growing rapidly since 1984 when the first work on the subject was reported. The above review of the literature reveals a set of common characteristics that make these areas suitable candidates for fuzzy logic applications. Some of the key attributes are the following: the ...

Heating, Ventilation and Air Conditioning (HVAC) systems: Fuzzy logic is used in control systems of HVAC for automatic and adaptive adjustment of temperature, humidity, and air flow and quality, in order to enhance the occupant''s thermal comfort. Also, fuzzy logic is used to make smart decisions about energy management and consumption.

This book is about fuzzy logic controller (FLC) and its applications in energy systems. It aims to give an insight into a clear understanding and design approaches of FLCs in MATLAB® and ...

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Finally, this chapter concludes that the advantages of fuzzy logic approach in handling the imprecise data and uncertainties can be exploited for the evaluation of power quality in modern power systems. This helps in better understanding about the severity levels of power quality disturbances and ranking them.

Fuzzy logic control has found extensive application in a wide range of power electronic systems, primarily due to its capability to handle complex and nonlinear systems, its robustness in the face of disturbances and uncertainties, its adaptability, ...

The three-area power system is widely considered a suitable example to test load frequency control of the distributed generation system. In this article, for such a system, for the power stabilization task, we introduce two controllers: Linear Quadratic Regulator (LQR), which is model-based, and Fuzzy Logic Controller (FLC), which is data-based. The purpose is to ...

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This series of three tutorials gives practising power engineers an overview and general appreciation of the basic concepts of fuzzy logic and an insight into how this technique can be ...

Chapters cover fuzzy inference, fuzzy logic-based control, feedback and feedforward neural networks, competitive and associate neural networks, and applications of fuzzy logic, deep ...

The growing complexity and sophistication of power systems have necessitated the development of intelligent tools to aid various planning and control operations. Many recent works have reported application of fuzzy logic to solve or aid ...

Due to the use of linguistic variables and fuzzy rules, the system can be made understandable to a non-expert operator. In this way, fuzzy logic can be used as a general methodology to ...

Introduction to Fuzzy Logic. Fuzzy Logic is a logic or control system of an n-valued logic system which uses the degrees of state "degrees of truth"of the inputs and produces outputs which depend on the states of the inputs and rate of change of these states (rather than the usual "true or false" (1 or 0), Low or High Boolean logic (Binary) on which the modern computer is based).

The first tutorial of this three-part series (see ibid., p.219, October 1997) gave a general introduction to fuzzy logic and the second one (see ibid., p.185, August 1998) examined comparison and integration with other techniques. This third and last tutorial discusses the general issues in applying fuzzy logic in power systems and presents some example ...

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The concept of fuzzy logic, introduced by Lotfi Zadeh in 1965, is based on the observation that human beings make decisions based on imprecise, subjective and non-numerical information 28, 29.Thus ...

What are the Differences between Fuzzy Logic, Regular Logic, and other Logic Systems? Fuzzy logic differs from classical logic systems in many ways. These points are important to be able to evaluate the applicability in specific systems and to make the optimal choice depending on the application. Comparison with classical logic

In fuzzy logic systems, since the inputs are defined as continuous functions, they are insensitive to model uncertainties and resistant to noise. ... et al (2019) Fuzzy logic based sinter RDI optimization. In: Proceedings--2019 4th international conference on power electronics and their applications, ICPEA 2019. Boada MJL, Boada B, Munoz A ...