Online detection method of capacitors

How does a capacitor test work?
In the test system, the capacitor voltage and arm current waveforms within 1 s are extracted. The voltage and current waveforms in one cycle are randomly selected to calculate the capacitance. As shown in Fig. 7, when the sampling points are 22, 82, 116, and 357, the SM is inserted into the system, and the capacitor voltage rises.

Are online ageing monitoring techniques suitable for real-time monitoring of DC link capacitors?
Although online ageing monitoring techniques are more complex,they are attractive and preferred for real-time monitoringof the converters. Various techniques have been proposed in the literature for online ageing monitoring of the DC link capacitors.

How accurate is a capacitance measurement method?
It can be seen that the calculated results of the capacitance value are not affected under different power conditions,and that the measurement error of the capacitance value under different power levels is less than 1%. Experimental results show that the accuracy of the proposed method is high.

Do uncalibrated capacitive voltage transformers degrade measurement accuracy?
Uncalibrated capacitive voltage transformers (CVTs) may significantly degrade measurement accuracy,because of the undetected excessive measurement error (ME). In this article,an online detection method is proposed which combines multi-source heterogeneous data composed of CVT measurements,acceptance test errors,and error limits.

How to calculate ESR in a DC-link capacitor?
The method estimates the ESR using switching frequency components of the dc-link capacitor voltage and current. The ESR value was estimated by extracting peak values of the capacitor voltage and current as well as the phase difference between these two signals.

How to detect early ageing condition in DC link capacitors?
Variation of the mentioned parameters in early ageing condition may be used as signatures for detection of this situation in DC link capacitors. Ageing monitoring of the AECs has been investigated in some researches, which can be classified into two categories: online and offline approaches.

This study deals with a new approach for real-time detection of early ageing in DC-link electrolyte capacitors of DC-DC converters. The method is based on the comparison ...

To address the problem, an online monitoring method for capacitor conditions based on sensorless capacitor voltage detection is proposed. Initially, the mapping relationship between the capacitance and its corresponding voltages is established on basis of the cell"s switching state and the principle of energy

conservation.

Understanding the aging mechanisms of electronic components in critical in power electronic converters. Capacitors are crucial components to monitor as they contribute to approximately 30% of electronic component failures in power electronic converters. The paper introduces a novel approach that utilizes a neuro-inspired Hierarchical Temporal Memory (HTM)-based machine ...

As electrolytic capacitor is apt to fail in power circuits, it is very important to identify its electrical parameters, mainly the equivalent series resistance (ESR) and capacitance (C). A noninvasive online identification method of capacitor"s ESR and C for continuous-conduction-mode (CCM) buck converter is proposed in this paper. Based on the ac ...

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To sum up, existing detection methods have several shortcomings. (1) The on-site insulation preventive test is periodical, which cannot detect breakdowns online and in real-time.

ripples of the capacitor. Also, online monitoring of ESR in DC-DC converters using the output voltage of a fixed Rogowski coil (RC) on the capacitor terminals has been proposed in [14]. In [15], another online ESR estimation method has been suggested, which is based on analysing output voltage and inductor current of the converter.

To identify abnormal capacitors, a condition monitoring method for capacitors is proposed in this paper using the cumulative sum detection of the sliding window algorithm. First, the bilateral cumulative sum algorithm of the sliding window is proposed to extract the switch-on time and switch-off time of the submodules (SMs).

In other words, an online detection method was developed based on double capacitors that has a simple structure, high measurement accuracy, fast detection speed, and low cost. A detection system was built with the STM32 chip microcomputer. We explore the influence of porosity and temperature on capacitance by selecting three kinds of corn ...

Fig. 2. Transformer equivalent (simplified) circuit. U1, I1, R1, X1? are the voltage, current, leakage resistance and leakage reactance of the primary side, U2 ?, I2 ?, R2 ?, X2? ? are the above-mentioned parameters converted from the ...

On the other hand, for online detection methods, the most direct and effective method is to estimate the ESR value using the correlation between current and voltage values [6, 7]. The ratio of capacitor voltage to supply

voltage can also ...

The development of artificial intelligence (AI)-based inductor current monitoring and anomaly detection in a pulse-width modulation (PWM) controlled phase shifted 3-level PSFB converter to be adopted for fast EV charger applications is presented.

An online method for identifying errors in measurements of the CVT based on equivariant adaptive source separation is proposed in this paper. Under normal operation, the secondary output information of three-phase CVT is linearly correlated, and equivariant adaptive separation via independence (EASI) is used to analyze the correlation of data ...

Highlights o Detect the CVT with abnormal measurement in real-time without power outages. o The regulation for determining abnormal CVT is its error surpass the limits. o ...

In modular multilevel converters (MMCs) of HVDC system, the metallized film capacitors (MFCs) suffer from complex electrical stresses. The aging of MFC is related to the accumulation of self-healing processes, which threatens the safety and reliability of the power system. In this study, a test platform was built for applying DC voltage as well as DC superimposed AC voltage to ...

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