

## DGA Data Interpretation Using Extension Theory for Power Transformer Diagnostics

**Authors :** O. P. Rahi, Manoj Kumar

**Abstract :** Power transformers are essential and expensive equipments in electrical power system. Dissolved gas analysis (DGA) is one of the most useful techniques to detect incipient faults in power transformers. However, the identification of the faulted location by conventional method is not always an easy task due to variability of gas data and operational variables. In this paper, an extension theory based power transformer fault diagnosis method is presented. Extension theory tries to solve contradictions and incompatibility problems. This paper first briefly introduces the basic concept of matter element theory, establishes the matter element models for three-ratio method, and then briefly discusses extension set theory. Detailed analysis is carried out on the extended relation function (ERF) adopted in this paper for transformer fault diagnosis. The detailed diagnosing steps are offered. Simulation proves that the proposed method can overcome the drawbacks of the conventional three-ratio method, such as no matching and failure to diagnose multi-fault. It enhances diagnosing accuracy.

**Keywords :** DGA, extension theory, ERF, fault diagnosis power transformers, fault diagnosis, fuzzy logic

**Conference Title :** ICEPE 2014 : International Conference on Electrical and Power Engineering

**Conference Location :** Paris, France

**Conference Dates :** July 21-22, 2014