

Chaotic Response of Electrical Insulation System with Gaseous Dielectric under High AC and DC Voltages

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Abstract : It is well known that if an electrical insulation system is stressed under high voltage then discharge may occur in various form and if the system is made of composite dielectric having interfaces of materials having different dielectric constant discharge may occur due to gross mismatch of dielectric constant causing intense local field in the interfaces. Here author has studied, firstly, behavior of discharges in gaseous dielectric circuit under AC and DC voltages. A gaseous dielectric circuit is made such that a pair of electrode of typical geometry is used to make the discharges occur under application of AC and DC voltages. Later on, composite insulation system with air gap is also studied. Discharge response of the dielectric circuit is measured across a typically designed impedance. The time evolution of the discharge characteristics showed some interesting chaotic behavior. Author here proposed some analysis of such behavior of the discharge pattern and discussed about the possibility of presence of such discharge circuit in lumped electric circuit.

Keywords : electrical insulation system, EIS, composite dielectric, discharge, chaos

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