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REGULATING THE TRANSMISSION LINE FROM EXTERNAL TAPING THROUGH MODIFIED IVACE

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ABSTRACT: ***In communications and electronic engineering a transmission line is a specialized cable or other structure designed to carry alternating current of radio frequency, that is, currents with a frequency high enough that their wave nature must be taken into account. Transmission lines are used for purposes such as connecting radio transmitters and receivers with their antennas, distributing cable television signals, trunklines routing calls between telephone switching centers, computer network connections and high speed computer data buses. This article covers two-conductor transmission line such as parallel line (ladder line), coaxial cable, Stripline, and microstrip. This proposed System model illustrates the principle of operation of an IVACE-based on fixed power supply connected to one of the two OGW of a fixed transmission line has best suited for developing the transmission network. Important areas of future research work on tower base earthing systems include (i) the installation a ring electrodes of different diameters and depths around each tower footing and (ii) further experimental studies to clarify the conduction mechanisms of earth electrodes under high magnitude impulse current. The objective of the experimental work on ring electrodes for controlling ground voltage gradient would be to mitigate step and touch voltages in the proximity of tower footings.***
Key word: IVACE, OGW, Transmission Line, phase conductor

I. INTRODUCTION

1.1 Transmission line

Transmission line is a specialized cable or other structure designed to carry alternating current of radio frequency, that is, currents with a frequency high enough that their wave nature must be taken into account. Transmission lines are used for purposes such as connecting radio transmitters and receivers with their antennas, distributing cable television signals, trunk lines routing calls between telephone switching centers, computer network connections and high speed computer data buses. This article covers two-conductor transmission line such as parallel line (ladder line), coaxial cable, Strip line, and micro strip. For the purposes of analysis, an electrical transmission line can be modelled as a two-port network, as follows:

Fig1.1:- Transmission line logic diagram

In the simplest case, the network is assumed to be linear (i.e. the complex voltage across either port is proportional to the complex current flowing into it when there are no reflections), and the two ports are assumed to be interchangeable. When sending power down a transmission line, it is usually desirable that as much power as possible will be absorbed by the load and as little as possible will be reflected back to the source. This can be ensured by making the load impedance equal to Z_0, in which case the transmission line is said to be matched.

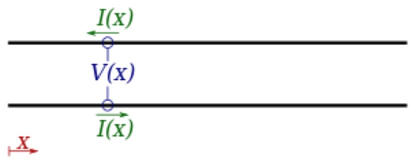

Fig 1.2:- Transmission line current travelling through

A transmission line is drawn as two black wires. At a distance x into the line, there is current I(x) travelling through each wire, and there is a voltage difference V(x) between the wires. If the current and voltage come from a single wave (with no reflection), then $V(x) / I(x) = Z_0$, where Z_0 is the characteristic impedance of the line.

1.2 Earthing Systems

The earthling system of electricity substations and transmission lines is required to ensure (i) electrical safety for persons working within or near the substation or in proximity of transmission towers and (ii) reduce damage to equipment while reducing disturbances to power system operations. Though high voltage transmission and distribution systems are protected from lightning strikes, the effectiveness of the lightning protection depends very much on its connection to earth.

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II. LITERATURE SURVEY

L. Gyugyi proposed with dynamic var compensation of electric power systems, applying power electronics for reactive power generation and control. After an overview of the emergence and status of modern, solid-state var compensators in utility and industrial applications, the first part of the paper explains how dynamic var compensation increases transmittable power by providing voltage support, transient stability improvement, and power oscillation damping in electric power transmission systems.[1]

M. H. Hague proposed a new control strategy of shunt flexible ac transmission system (FACTS) devices to improve the first swing stability limit of a simple power system. It is shown that the speed based bang-bang control (BBC) is unable to use the entire decelerating area in maintaining stability. The proposed control strategy improves the stability limit first by maximizing the decelerating area and then fully utilizing it in counterbalancing the accelerating area.[2]

E. Hammad proposed "Today's electric power systems are continually increasing in complexity due to interconnection growth, the use of new technologies, and financial and regulatory constraints. Sponsored by the Electric Power Research Institute, this expert engineering guide helps you deal effectively with stability and control problems resulting from these major changes in the industry.[3]

N. G. Hingorani, and L. Gyugyi Proposed the flexible ac transmission system (FACTS) is a new technology, based on power electronics, to enhance power system capability through the ability of high-speed electronic control of ac transmission line parameters. Written by two pioneers in FACTS technology, Hingorani and Gyugyi, they present a very useful guide for power electronic application engineers, which emphasizes explanations of the physical principles rather than detailed mathematical theory. [4]

P. Kundur Proposed a fundamental analysis of the application of static VAr compensators (SVC) for stabilizing power systems. Basic SVC control strategies are examined in terms of enhancing the dynamic and transient stabilities, improving timeline transmission capacity and damping power oscillations. Synchronizing and damping torque contributions of the SVC are determined for different controls.[5]

III. PROPOSED TECHNIQUE

Introduced of capacitive coupling with the three phase conductors is proposed in modified model that will enhance the present capacity of existing services. When a section OGW is disconnected from ground, an AC voltage at the fundamental frequency (60 Hz or 50 Hz) is induced on this OGW by capacitive coupling with the three phase conductors. Higher voltages are obtained with tower configurations yielding large asymmetries between OGW and phase conductors. The maximum available power is proportional to the length of isolated OGW. For typical 735-kV line parameters (as those used in this model), isolating a 4 km section of one of the two OGW allows tapping 25 kW of power.

3.1 Description of Implementation

When a high voltage transmission line passing through remote areas where no proper distribution network is available, it might be tap power from the overhead ground wires (OGW) protecting the line against lighting strokes. IVACE technology developed by Hydro-Quebec provides power to telecommunication towers located in the northern part of its network.

IV. CONCLUSION & FUTURE WORK

The proposed model is sufficient to show by graph that it tap power from the overhead ground wires (OGW) that is protecting the line against lighting strokes. This proposed System model illustrates the principle of operation of an IVACE-based on fixed power supply connected to one of the two OGW of a fixed transmission line has best suited for developing the transmission network. Important areas of future research work on tower base earthing systems include (i) the installation a ring electrodes of different diameters and depths around each tower footing and (ii) further experimental studies to clarify the conduction mechanisms of earth electrodes under high magnitude impulse current. The objective of the experimental work on ring electrodes for controlling ground voltage gradient would be to mitigate step and touch voltages in the proximity of tower footings.

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