Salwa Akl

بسم اللّه الرحمن الرحيم

مركز الشبكات وتكنولوجيا المعلومات

قسم التوثيق الإلكتروني

Salwa Akl

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم باللّه العظيم أن المادة التي تم توثيقها وتسجيلها

علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

Salwa Akl

بعض الوثائق الأصلية تالفة
وبالرسالة صفحات لم ترد بالأصل

Mansoura University
Faculty of Engineering
Electrical Power & Machines Dept.

OVERVOLTAGES IN POWER SYSTEMS

By

Eng. **Mohamed Mahfouz Aly Mahfouz**
(B. Sc.(1992) in Electrical Engineering)

Thesis Submitted in Partial Fulfillment of The Requirements For
The degree of Master (M.Sc.)

In
Electrical Engineering

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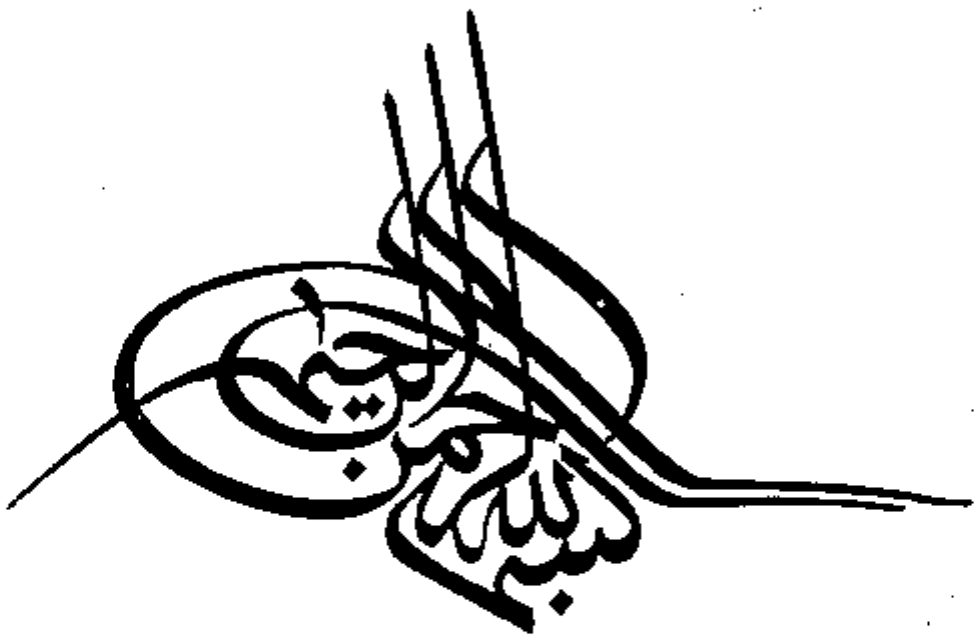


بسم الله الرحمن الرحيم
وأنزل الله عليك الكتاب والحكمة وعلمك
ما لم تكن تعلم وكان فضل الله عليك عظيما
منتدى أهل التفسير

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ABSTRACT

Study of overvoltages in power systems are important specially in Extra and Ultra High Voltage systems (EHV& UHV).The study in such systems are necessary for reliable design and economic operation .

Power systems are subjected to many forms of transient phenomena brought about essentially by sudden changes in the steady state values of voltages or currents.Such changes may be the result of atmospheric disturbances such as lighting or result from some operating conditions such as switching .These disturbances cause overvoltages surges which are different in their magnitude,shape and duration .Overvoltages are classified to three main types,transient,steady state,and resonance overvoltages.

The calculation of Transient phenomena in power systems is not simple .This is because that the power system itself consists of different elements whose characteristics vary widely .Some elements are distributed and/or lumped and may be mutually coupled, while others such as sources are linear and/or nonlinear.

This thesis studies resonance overvoltages in Egyptian EHV system (500 kV).Its causes and its effects on power system elements.The study suggested three solutions to avoid resonance overvoltages due to shunt reactors .which are essential elements in high voltage networks.

The suggested solutions are :

1- The optimum capacity of reactors are less than 100 MVAR or greater than 200 MVAR.
2- The optimum location of the reactors is at the substation bus bar.
3- new technique which this thesis presents by setting operation policies between the reactor and it's line circuit breakers.

The study also carried out for the future Egyptian EHV system to check the reasonability of the suggested solutions

This thesis studies also the steady state overvoltages in Egyptian EHV system due to loading conditions and Ferranti effects.

The study presents an overvoltages automatics setting to protect the system against this type of overvoltages.

The study also carried out for the future Egyptian EHV system to check the reasonability of the suggested setting.

The study show that the suggested setting is satisfied for the existing and the future system.

Electro-Magnetic Transient Program (EMTP) is used for such studies. EMTP is a widely used program around all the world to simulate the electric power networks .It solves the algebraic, ordinary ,and partial differential equations that are associated with the interconnection of the different power system elements.

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